U.S. DEPARTMENT OF COMMERCE
Patent and Trademark Office

PENNSYLVANIA STATE UNIVERSITY
MAR 2 8 1983

PATENT PROFILES

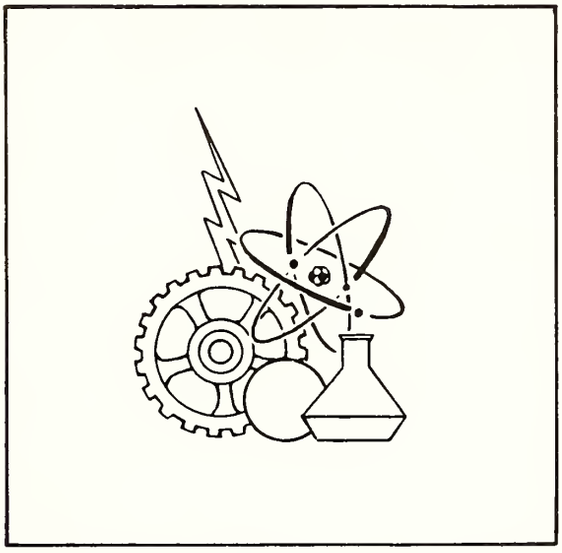
MICROELECTRONICS – II

PATENT PROFILES

a publication from the—

OFFICE OF
TECHNOLOGY ASSESSMENT
& FORECAST

PENNSYLVANIA STATE UNIVERSITY
MAR 28 1983
DOCUMENTS COLLECTION



U.S. DEPARTMENT OF COMMERCE

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INTRODUCTION

Background

Patents, as incentives for innovation, are well established in the U.S. free-enterprise system. Often overlooked, however, is a second great benefit of the patent system: the enormous, continually expanding patent file. This file includes more than four million U.S. patents. These patents are classified and cross-referenced among the approximately 110,000 categories of technology that make up the U.S. Patent Classification System. Along with similarly categorized foreign patents and other technical publications, they make up a collection totaling over 25 million documents -- a collection which grows by over half a million documents annually.

Patent law requirements for a full disclosure of the invention (which is then published as part of a patent grant) have resulted in a unique assemblage of technological information. Not only does the patent file embody the most comprehensive collection of technical information of its kind in the world, the information is inherently presented in a manner such that nearly every significant development in almost all technical fields flows in a natural time-series sequence -- virtually welcoming monitoring and analysis.

In its own unique way, this file represents a national resource. The Patent and Trademark Office (PTO) recognizes the heavy responsibilities not only to preserve, maintain, and improve the file, but, as well, to maximize its use for the greatest public benefit. As part of the effort to discharge this latter responsibility, the Patent and Trademark Office established its technology assessment and forecast program in 1971.

In its most general terms, the mission of the program is to stimulate and enhance the use and usability of the patent file, and to assemble, analyze and make available meaningful data about the file. In carrying out this mission, the Office of Technology Assessment and Forecast (OTAF), which administers the program, has assembled and built a master data base covering all U.S. patents. This data base has been used to support: (1) the preparation of 16 OTAF publications (See Appendix B); and (2) OTAF's custom report services (see Appendix C).

PATENT PROFILES

In an effort to continually provide data in a form which is useful and convenient to the interested reader, OTAF, in December 1979, initiated a new publication series -- PATENT PROFILES. Each publication deals with a specific technological area and, for a given period of time, surveys the patent activity of that area.

PATENT PROFILES publications provide many different kinds of information about a particular area of the patent file and assemble this information in a format which enables the user to extract easily the information needed. Thus, interested users, both technically and non-technically oriented, from the public and private sectors, are able to gain insight into the "who, what and where" of the patent activity and, perhaps, discern the direction in which a technology is headed.

The objective of these publications is to increase the awareness and use of the U.S. patent file as a prime technological information resource, so that the file may contribute more fully to the knowledge from which future inventors and innovators draw, and upon which corporate and public policy planners rely.

About This Publication

This is the second publication in the PATENT PROFILES series which deals with microelectronics. Microelectronics, simply defined, means circuits and systems which use extremely small electronic parts. In recent years the term has been applied almost exclusively to integrated circuit semiconductor technology.

Microelectronics - I was directed to two areas of microelectronics, namely specific integrated circuit structure and systems involving the use of a microelectronic processing device or "CPU." The profile of these two topics represented an effort to "snapshot" selected, highly-active areas of microelectronics which could be reasonably isolated through the use of the U.S. Patent Classification System.

Microelectronics - II, in a continuing effort in that direction, covers two further areas of the technology -- **Digital Logic Circuits** and **Semiconductor Memories.** Additionally it includes an initial specific example of a practical application of microelectronic circuits, i.e., **Speech Analysis and Synthesis.**

Digital Logic Circuits provide a prime example of the evolution of electronics from discrete parts, i.e., transistors, resistors, etc., to monolithic integrated circuits. A digital circuit of any desired complexity can be constructed of relatively simple digital elements, thus providing a ready market for monolithic digital elements. Furthermore, since digital logic uses Boolean Algebra, precise voltage ranges are not required. That is, production tolerances are not as critical when only a "high" or "low" state corresponding to a "1" and "0," respectively, is required.

Although the patents included in this profile are not necessarily limited to microelectronic circuits, virtually all of the disclosed digital circuits have been, or are capable of being, integrated.

Semiconductor Memories are a good example of Large Scale Integrated or "LSI" circuits. In fact, such memories represent the first successful commercial applications of LSI, and continue to be an active area of research. While monolithic integrated circuits, such as most elemental digital logic circuits, are comprised of electronic parts, i.e., tran-

sistors, resistors, etc., LSI circuits are comprised of many such monolithic integrated circuits, generally on the order of 100 or more. Successful improvements in reliability and reduction in size of these memories have made possible the current boom in microprocessor technology.

It should be mentioned that digital logic circuits and semiconductor memories are not totally mutually exclusive. Since some logic circuits are designed specifically for use in memories, some patents will appear in both profiles.

Speech Analysis and Synthesis is a prime example of how the use of microelectronic circuits has spawned an industry. Although efforts to artificially synthesize the human voice have been going on for over 200 years, such synthesizers have, until recently, been mechanical contraptions of very limited practical value. The extremely complex waveforms generated by the human vocal tract are difficult to simulate via a mechanical device. More recently, speech waveforms have been analyzed and manipulated electronically in an effort to improve the efficiency of voice transmission over telephone lines. As a result of these efforts, speech signals have been digitally encoded using techniques such as Pulse Code Modulation (PCM), and these digital signals transmitted in place of analog representations of the speech waveforms. Speech data compression techniques such as delta modulation, where only the change in voice level is encoded rather than the actual value, have increased the efficiency of voice transmission systems. As an outgrowth of these efforts, electronic speech synthesizers have been developed which artificially create speech.

The enormous data storage capacity and extremely rapid accessing capability of microelectronic memories and processors has made it possible to store digital representations of complex speech waves and to reconstruct those waves through a digital model of the vocal tract. Research in the field is burgeoning, and commercially successful applications of speech synthesizers have just begun.

New Features in This Publication

Following the profiles is a brief analysis of the assignment data generated in the digital logic circuits and semiconductor memories profiles. Included are graphs showing the number of organizations receiving patents each year and graphs showing the percentage of patents assigned to "active" organizations each year.

Also included in each profile is a list of 10 patents which are considered to be of particular significance in the art area. The front page of each of these patents is reproduced along with a brief explanation of why it was selected.

Microelectronics - I and II have not exhausted the coverage of this extremely complex and rapidly evolving field. Depending upon available resources and interest, further reports in the series are planned. Possible additional areas include microelectronic device manufacturing techniques and further applications of microelectronic circuitry.

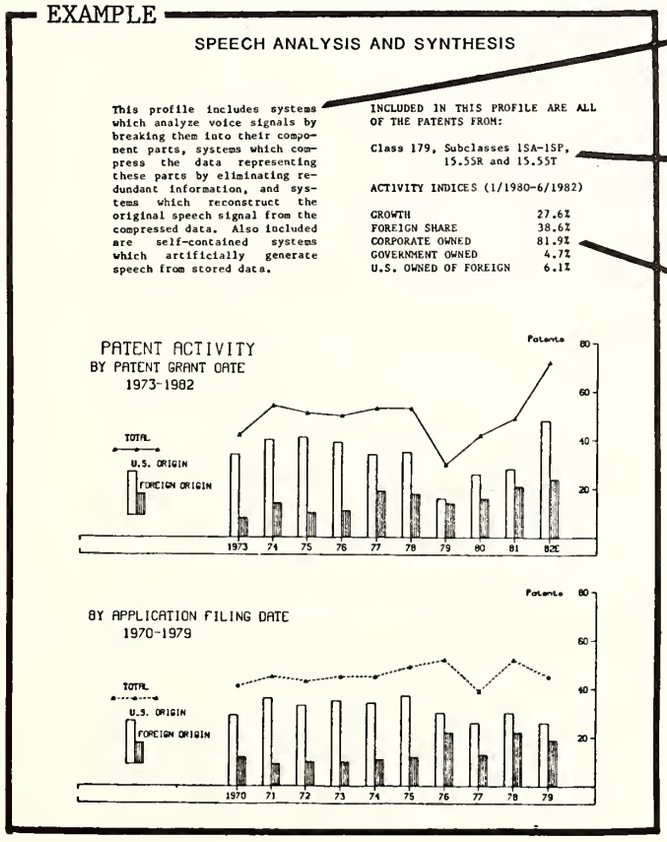
EXPLANATION OF DATA AND FORMAT

This report presents profiles of patenting* in 3 areas of Microelectronics. Each of the profiles is divided into seven parts (1, 2A, 2B, 2C, 2D, 3 and 4):

Part 1 - Activity Summary

Part 1, the first page of each profile, identifies the area which is examined, lists the pertinent U.S. Patent Classification(s) involved, and graphically illustrates patent activity (across a designated 10-year span) in two ways: (1) by the patent grant date; (2) by the granted patents' application filing date. In the former method, the patent activity figures for the year 1982 are estimates arrived at by doubling the actual number of patents in each category for the first 6 months of 1982. The latter method presents what is often considered a more useful measurement tool since application filing dates are closer in time to the actual development of the technology disclosed in the patent and are independent of PTO production variance.** The relative growth in the particular technological area, as well as levels of involvement by foreign residents, corporations, and government agencies, expressed as a percentage of recent U.S. patent activity, are presented in the "Activity Indices" (defined below).

EXAMPLE


SPEECH ANALYSIS AND SYNTHESIS
This profile includes systems which analyze voice signals by breaking them into their component parts, systems which compress the data representing these parts by eliminating redundant information, and systems which reconstruct the original speech signal from the compressed data. Also included are self-contained systems which artificially generate speech from stored data.
INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM:
Class 179, Subclasses 1SA-1SP, 15.55R and 15.55T
ACTIVITY INDICES (1/1980-6/1982)
GROWTH 27.6%
FOREIGN SHARE 38.6%
CORPORATE OWNED 81.9%
GOVERNMENT OWNED 4.7%
U.S. OWNED OF FOREIGN 6.1%
PATENT ACTIVITY BY PATENT GRANT DATE 1973-1982
Patents
TOTAL
U.S. ORIGIN
FOREIGN ORIGIN
1973 74 75 76 77 78 79 80 81 82E
BY APPLICATION FILING DATE 1970-1979
1970 71 72 73 74 75 76 77 78 79

SCOPE OF TECHNOLOGY

U.S. PATENT CLASSIFICATION

ACTIVITY INDICES - DEFINED

% GROWTH: the number of patents issued in the period 1/1980-6/1982 divided by the total number of patents in the period 1/1973-6/1982. (Average for all technologies = 24.9%)

% FOREIGN: the number of patents issued to residents of foreign countries in the period 1/1980-6/1982 divided by total number of patents issued in this period. (Average for all technologies = 40.1%)

% CORPORATE OWNED: the number of 1/1980-6/1982 patents assigned at time of issue to U.S. or foreign non-government organizations -- mainly corporations -- divided by the total number of patents issued in this period. (Average for all technologies = 75.9%)

% GOVERNMENT OWNED: the number of 1/1980-6/1982 patents assigned at time of issue to the U.S. or a foreign government divided by total number of patents issued in this period. (Average for all technologies = 2.4%)

% U.S. OWNED OF FOREIGN: the number of 1/1980-6/1982 patents with a foreign resident inventor that are assigned to a U.S. organization, divided by the number of patents with a foreign resident inventor in these years. (Average for all technologies = 7.2%)

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* U.S. Patents only

**See further explanation in Appendix A.

Part 2A - Patent Activity by Date

Part 2A of each profile shows in tabular form the data relied upon in constructing the charts in Part 1. The first table shows the yearly distribution of patents by the date of the patent grant, while the second table redistributes these data based on the application filing date of the patents. The usefulness of this latter data distribution is mentioned in the explanation of Part 1, and further detailed in Appendix A.

EXAMPLE

SEMICONDUCTOR MEMORIES

PATENT ACTIVITY (1/63- 6/82) BY DATE OF PATENT GRANT

	NUMBER OF PATENTS									
	63-68	1969	1970	1971	1972	1973	1974	1975	1976	1977
TOTAL	149	43	63	76	113	83	75	74	89	106
U.S. ORIGIN	130	35	50	66	96	65	50	61	67	68
FOREIGN ORIGIN	19	8	13	10	17	18	25	13	22	38
JAPAN	4	3	3	1	10	5	6	8	8	15
WEST GERMANY	3	1	3	2	2	5	7	3	8	12
UNITED KINGDOM	4	1	5	4	3	3	5	1	1	2
FRANCE	2		1	1		1	4	1	5	2
NETHERLANDS	3		1		2	1				4
SWITZERLAND	1					1	2			1
CANADA				2			1			1
U.S.S.R.		1				1				
DENMARK		2								
SWEDEN	1					1				
ALGERIA	1									
ISRAEL										
ITALY										
S. AFRICA										1
BURMA										
U.S. ORIGIN	130	35	50	66	96	65	50	61	67	68
U.S. CORP. OWNED	121	35	47	62	91	63	50	56	63	63
U.S. GOVT. OWNED	7			1				4	3	1
U.S. INDIV. OWNED	2		3	3	4	2		1	1	4
FOREIGN OWNED					1					
FOREIGN ORIGIN	19	8	13	10	17	18	25	13	22	38
U.S. OWNED	6		10	5	4	5	6	3	3	12
FOREIGN OWNED	13	8	3	5	13	13	19	10	19	26
FOREIGN CORP.	12	6	3	5	13	12	16	9	19	26
FOREIGN GOVT.										
FOREIGN INDIV.	1	2				1	3	1		

Part 2B - Organizational Patenting - Ranked

Part 2B of each profile provides a list of assignees* ranked by the number of patents, in the technology, to which they held title at the time of the patent grant. The listing is limited by designation of a "cut-off" number (e.g., "2 or more patents"). This list identifies the assignees who received the most patents in the profiled technology during the period 1/1969-6/1982. By far, the largest portion of the assignees are corporations.

EXAMPLE

SPEECH ANALYSIS AND SYNTHESIS

Organizational Patenting: Ranked

NO. OF PATENTS	ASSIGNEES WITH 3 OR MORE PATENTS (1/1969-6/1982)
85	BELL TELEPHONE LABORATORIES INC.
29	INTERNATIONAL BUSINESS MACHINES CORP.
23	NIPPON ELECTRIC CO., LTD.
19	UNITED STATES OF AMERICA, NAVY
16	TEXAS INSTRUMENTS, INC.
13	UNITED STATES OF AMERICA, ARMY
13	U.S. PHILIPS CORP.
10	HITACHI, LTD.
10	INTERNATIONAL TELEPHONE AND TELEGRAPH CORP.
9	SHARP KABUSHIKI KAISHA
9	THRESHOLD TECHNOLOGY INC.
8	AERONUTRONIC FORD CORP.
8	COMMUNICATIONS SATELLITE CORP.
8	THOMSON-CSF
8	WESTINGHOUSE ELECTRIC CORP.
7	CAMBRIDGE RESEARCH AND DEVELOPMENT GROUP
7	INTERNATIONAL STANDARD ELECTRIC CORP.
7	XEROX CORP.
6	NIPPON TELEGRAPH AND TELEPHONE PUBLIC CORP.
6	SONY CORP.
5	FEDERAL SCREW WORKS
5	FUJI XEROX CO., LTD.
5	MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.
5	RCA CORP.

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*See definition in Appendix A.

Part 2C - Organizational Patenting - Alpha Listing

Part 2C of each profile also covers assigned patenting during the period 1/1969-6/1982. Assignees are listed alphabetically followed by a numerical listing of their patents with titles.

This section provides valuable information to potential entrepreneurs, competitors and those in need of technological know-how by identifying corporate actors in the field. Inclusion of patent titles further defines the subject technology.

EXAMPLE

SEMICONDUCTOR MEMORIES

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

ACTRON INDUSTRIES, INC.
3959784 - HIGH SPEED OPTICAL READ-OUT OF DATA STORED IN AN ARRAY

ADVANCED MEMORY SYSTEMS INC.
3795898 - RANDOM ACCESS READ/WRITE SEMICONDUCTOR MEMORY

ADVANCED MICRO DEVICES, INC.
4272811 - WRITE AND READ CONTROL CIRCUIT FOR SEMICONDUCTOR MEMORIES

AGENCE NATIONALE DE VALORISATION DE LA RECHERCHE (ANVAR)
3860916 - OPTICAL INFORMATION STORAGE DEVICE
3950738 - SEMI-CONDUCTOR NON-VOLATILE OPTICAL MEMORY DEVICE

AMERICAN MICRO-SYSTEMS, INC.
4003036 - SINGLE IGFET MEMORY CELL WITH BURIED STORAGE ELEMENT
4105475 - EPITAXIAL METHOD OF FABRICATING SINGLE IGFET MEMORY CELL
4214312 - VMOS FIELD ALIGNED DYNAMIC RAM CELL
4222062 - VMOS FLOATING GATE MEMORY DEVICE

AMERICAN MICROSYSTEMS
4222063 - VMOS FLOATING GATE MEMORY WITH BREAKDOWN VOLTAGE

Part 2D - Inventors of Individually Owned Patents

In Part 2D, inventor names, full addresses, patent numbers and titles are given for unassigned 1/1975-6/1982 patents; inventor names, city and state, patent numbers and titles are given for patents assigned to individuals. This information facilitates identification of the apparently unaffiliated or "independent inventor" participants in the technology. Standard, two-character codes are used to designate U.S. states and foreign countries. While the meaning of state codes should be obvious, the foreign country codes may not. Consequently, those appearing in the Part 2D listing are defined in Appendix A.

EXAMPLE

SEMICONDUCTOR MEMORIES PAGE D

INVENTORS OF INDIVIDUALLY OWNED PATENTS (1/75- 6/82) (ALPHA LISTING)

INVENTOR NAME	STREET	CITY	ST	ZIP/CNTRY
STERN ERNEST	31 OXBOW ROAD	CONCORD	MA	01742
4066984 - SURFACE ACOUSTIC WAVE DEVICES FOR PROCESSING AND STORING SIGNALS				
UHLMANN LOTHAR	BLOCK 37	JENA		DT
3860915 - MATRIX ARRANGEMENT FOR OPERATING OPTICAL ELEMENTS				
YOUNG CHARLES R.	241 CATO DRIVE	XENIA	OH	45385
4064492 - VIRTUALLY NONVOLATILE RANDOM ACCESS MEMORY CELL				

At the end of Part 2D is a list of those patents (1/1963-6/1982) with neither assignment nor inventor information in the data base. Essentially, this encompasses all patenting in the period 1963-1968, and unassigned patents from 1969 through 1974. Titles are included for most patents granted subsequent to January, 1969.

PATENTS (1/63- 6/82) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN THE DATA BASE

3431433 - DIGITAL STORAGE DEVICES USING FIELD-EFFECT TRANSISTOR BITABLE CIRCUITS
3450967 - SELENIUM MEMORY CELL CONTAINING SILVER UP TO 2 ATOMIC PERCENT ADJACENT THE RECTIFYING CONTACT
3492659 - ELECTRICAL RESISTANCE MEMORY
3501752 - PULSE-TYPE MAGNETIC CORE MEMORY ELEMENT CIRCUIT WITH BLOCKING OSCILLATOR FEEDBACK
3513365 - FIELD-EFFECT INTEGRATED CIRCUIT AND METHOD OF FABRICATION
3573485 - COMPUTER MEMORY STORAGE DEVICE
3576548 - FIXED MEMORY SYSTEM USING FIELD EFFECT DEVICES
3613055 - READ-ONLY MEMORY UTILIZING SERVICE COLUMN SWITCHING TECHNIQUES

Part 3 - Selected Patents

Part 3 of each profile includes a brief description of the technology as illustrated by 10 patents from the profiled area. These 10 patents were selected as being significant advances in the state of the art. Following the description, the front, or summary, page of each selected patent is depicted together with an explanation of the advance represented by that patent. The front page of each patent provides bibliographic information, such as the inventor, assignee, filing date and patent classification, along with a brief abstract describing the invention and, where appropriate, a representative drawing illustrating the invention.*

Part 4 - Reference Citation Information

Part 4 of each profile provides information about the references which were cited during the examination period of patents which issued in the technology between 1/1975 and 6/1982. This information may be indicative of the countries, corporations and patents which dominate the technological area. The total number of U.S. patents which issued is given, followed by the total number of references considered by the examiner during the examination of these patents. The number of references is given in three categories -- U.S., foreign and non-patent references. For those reference citations which are U.S. patents issued since 1963, there are included: 1) the distribution according to the country of origin; 2) a list of the four most frequently cited patents and the number of times each was cited; 3) a list of the four most frequently cited assignees and the number of times each was cited. Assignee data is limited to patents granted between 1/1969-6/1982.

Assignment Analysis

Beginning on page 151, is a brief analysis of 1) the total number of organizations receiving patents; 2) the percentage of patents being assigned to "active" organizations and 3) the percentage of patents being assigned to "new" organizations for each year during the period 1969-1981. These data were generated for the **Digital Logic Circuits** and **Semiconductor Memories** profiles in an effort to determine whether the patent activity in these two technology areas was being increasingly dominated by a small number of large corporations.

Important Note

It should also be noted that in 1979, the Patent and Trademark Office issued substantially fewer patents than normal (about 49,000 as compared to about 66,000 in 1978) due to a lack of funds to print patents. Therefore, while the 1979 patent grant data may be low, the decrease should not be attributed to a fall-off in technological activity.

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*Appendix A gives a further explanation of the information to be found on the front page of a patent.

DIGITAL LOGIC CIRCUITS

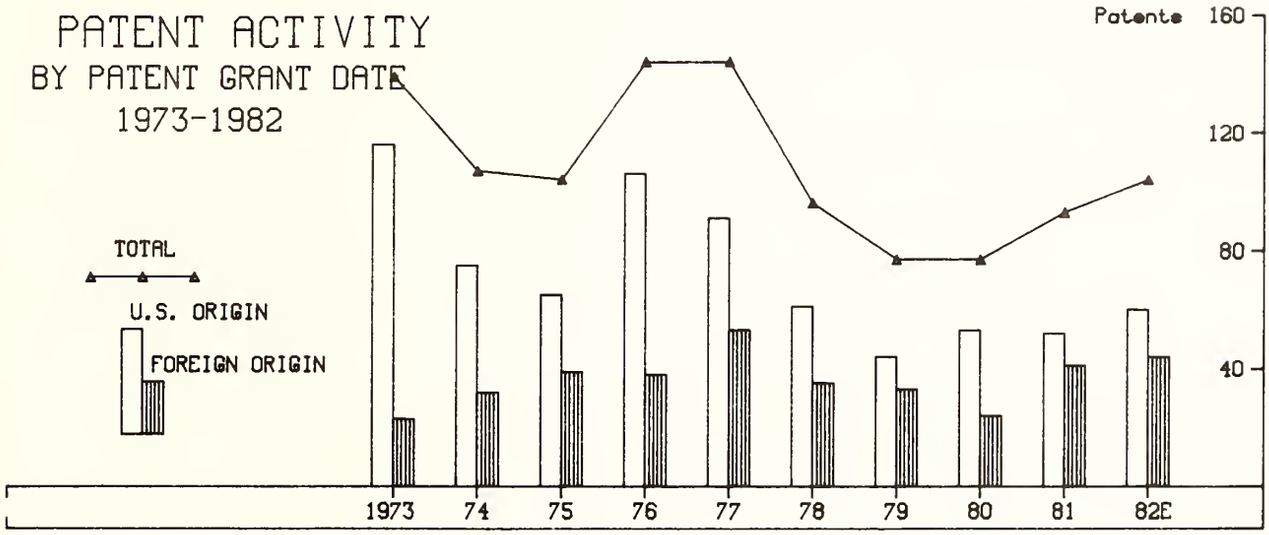
This profile includes circuits which use non-linear solid state devices to perform non-arithmetical operations. The circuits use digital electrical signal information. Included are systems which perform the common Boolean algebraic operations of AND, OR, NAND, NOR, and NOT, as well as exclusive functions such as exclusive OR.

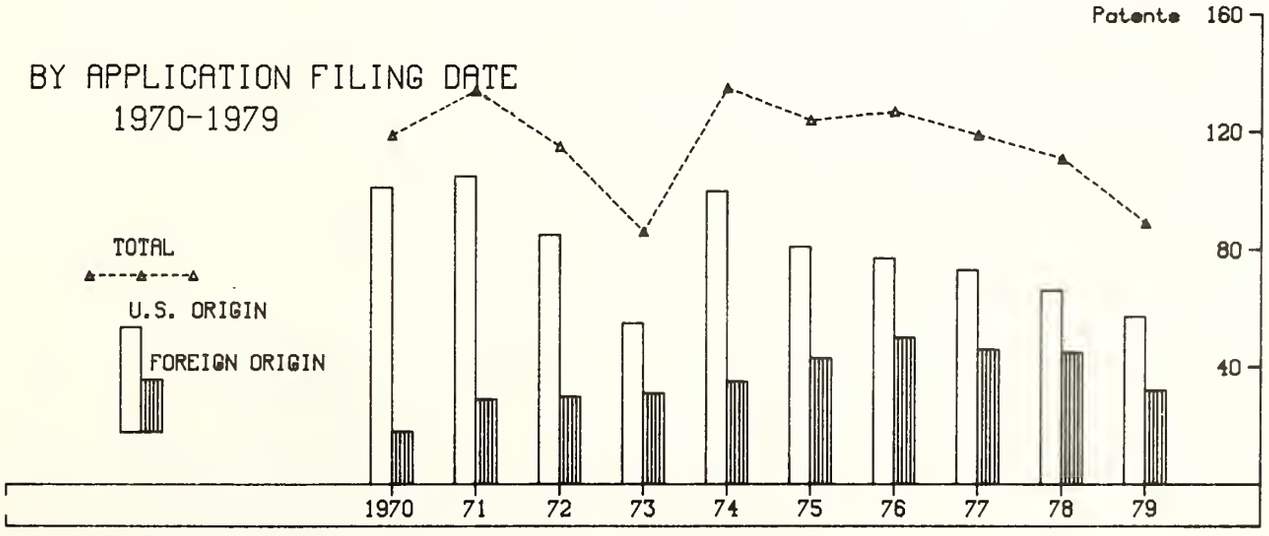
INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM:

Class 307, Subclasses 440-482

ACTIVITY INDICES (1/1980-6/1982)

GROWTH	21.5%
FOREIGN SHARE	39.2%
CORPORATE OWNED	96.4%
GOVERNMENT OWNED	.5%
U.S. OWNED OF FOREIGN	20.7%





DIGITAL LOGIC CIRCUITS **PART 2A**

PATENT ACTIVITY (1/63- 6/82) BY DATE OF PATENT GRANT

	NUMBER OF PATENTS															
	63-68	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	TOTAL
TOTAL	681	103	123	193	127	139	107	104	144	144	96	77	77	93	52	2260
U.S. ORIGIN	605	83	100	147	100	116	75	65	106	91	61	44	53	52	30	1728
FOREIGN ORIGIN	76	20	23	46	27	23	32	39	38	53	35	33	24	41	22	532
JAPAN	9	4	5	17	10	9	10	20	32	27	22	15	15	25	12	232
WEST GERMANY	12	4	5	13	9	6	9	11	2	9	6	7	2	7	2	104
UNITED KINGDOM	23	2	3	5	1		2	1	1	7	2	3	1	1	1	53
FRANCE	13	4	2	4	2	2	4	2	2	4	2	2	1	4	2	50
SWITZERLAND	4	2	1	4	2		2	2	1	2		1	3		2	26
CANADA	4	1	2		1	3	1	1		1	2		1		1	18
NETHERLANDS	3	2	3	1		1		1		1		2	1	1	1	17
ITALY	3				1	1	2							1		8
U.S.S.R.		1					1			1		2		1		6
SWEDEN				2								1			1	4
BELGIUM	2					1										3
DENMARK	1		1													2
CZECHOSLOVAKIA	1									1						2
ISRAEL	1															1
HUNGARY					1											1
POLAND							1									1
GREECE			1													1
VENEZUELA														1		1
SPAIN								1								1
S. AFRICA											1					1
U.S. ORIGIN	605	83	100	147	100	116	75	65	106	91	61	44	53	52	30	1728
U.S. CORP. OWNED	558	76	92	129	95	110	72	62	103	87	59	43	52	50	29	1617
U.S. GOVT. OWNED	35	6	7	12	1	2	2	3	2	2	2	1		1		76
U.S. INDIV. OWNED	12	1	1	5	4	3	1		1	2			1		1	32
FOREIGN OWNED				1		1								1		3
FOREIGN ORIGIN	76	20	23	46	27	23	32	39	38	53	35	33	24	41	22	532
U.S. OWNED	20	5	6	8	2	4	2	10	2	8	3	4	4	7	7	92
FOREIGN OWNED	56	15	17	38	25	19	30	29	36	45	32	29	20	34	15	440
FOREIGN CORP.	54	13	15	37	23	19	26	28	33	42	31	26	19	31	14	411
FOREIGN GOVT.		1	1													2
FOREIGN INDIV.	2	1	1	1	2		4	1	3	3	1	3	1	3	1	27

DIGITAL LDGIC CIRCUITS

PATENT ACTIVITY (PATENTS GRANTED 1/67- 6/82) BY DATE DF PATENT APPLICATION

	NUMBER DF PATENTED APPLICATIDNS															
	PRE 69	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	TDTAL
TDTAL	479	109	119	134	115	86	135	124	127	119	111	89	20			1767
U.S. ORIGIN	389	82	101	105	85	55	100	81	77	73	66	57	12			1283
FDREIGN ORIGIN	90	27	18	29	30	31	35	43	50	46	45	32	8			484
JAPAN	19	11	5	8	9	22	18	28	30	22	32	17	3			224
WEST GERMANY	20	4	9	10	9	4	6	5	9	10	3	6	2			97
UNITED KINGDDM	12	4	1	1	1	1	1	2	8	3	1		1			36
FRANCE	15	2	2	3	3		5	3	1	4	2	4				44
SWITZERLAND	4	4		2	2	1	2	2	1		3	1	1			23
CANADA	7			2	2	2	1			2	1	1				18
NETHERLANDS	6				1		1	1		3	1	1				14
ITALY	1			2	2							1				6
U.S.S.R.	1					1		1		1	2					6
SWEDEN	1	1								1			1			4
BELGIUM	1				1											2
DENMARK	1	1														2
CZECHDSLOVAKIA	1							1								2
ISRAEL																
HUNGARY			1													1
POLAND				1												1
GREECE	1															1
VENEZUELA												1				1
SPAIN							1									1
S. AFRICA									1							1
U.S. ORIGIN	389	82	101	105	85	55	100	81	77	73	66	57	12			1283
U.S. CDRP. OWNED	352	76	90	98	83	50	98	79	75	70	63	56	12			1202
U.S. GDVT. OWNED	31	3	7	1	1	3	2	1	2	2	2					55
U.S. INDIV. OWNED	5	3	4	5	1	2		1		1		1				23
FOREIGN OWNED	1			1							1					3
FOREIGN DRIGIN	90	27	18	29	30	31	35	43	50	46	45	32	8			484
U.S. DWNED	19	6		4	4	4	8	6	4	7	5	8	3			78
FOREIGN OWNED	71	21	18	25	26	27	27	37	46	39	40	24	5			406
FDREIGN CORP.	66	19	17	23	24	26	25	34	45	36	37	21	5			378
FDREIGN GOVT.	2															2
FDREIGN INDIV.	3	2	1	2	2	1	2	3	1	3	3	3				26

DIGITAL LOGIC CIRCUITS

Organizational Patenting: Ranked

NO. OF PATENTS	ASSIGNEES WITH 7 OR MORE PATENTS (1/1969-6/1982)
199	INTERNATIONAL BUSINESS MACHINES CORP.
93	RCA CORP.
85	MOTOROLA
65	BELL TELEPHONE LABORATORIES INC.
58	HITACHI, LTD.
51	TEXAS INSTRUMENTS, INC.
47	ROCKWELL INTERNATIONAL CORP.
41	TOKYO SHIBAURA ELECTRIC CO., LTD.
39	SIEMENS AKTIENGESELLSCHAFT
33	WESTINGHOUSE ELECTRIC CORP.
30	U.S. PHILIPS CORP.
23	NATIONAL SEMICONDUCTOR CORP.
23	NIPPON ELECTRIC CO., LTD.
22	GENERAL ELECTRIC CO.
22	SPERRY CORP.
21	BURROUGHS CORP.
21	HONEYWELL INC.
20	SIGNETICS CORP.
19	INTEL CORP.
19	UNITED STATES OF AMERICA, NAVY
18	HONEYWELL INFORMATION SYSTEMS INC.
17	FAIRCHILD CAMERA AND INSTRUMENT CORP.
14	GENERAL INSTRUMENT CORP.
14	HUGHES AIRCRAFT CO.
13	FUJITSU LTD.
13	MOSTEK CORP.
12	HEWLETT-PACKARD CO.
11	TELETYPE CORP.
10*	GTE AUTOMATIC ELECTRIC LABORATORIES INC.
10	NCR CORP.
10	THOMSON-CSF
9	COLLINS RADIO CO.
9	KABUSHIKI KAISHA SUWA SEIKOSHA
9	UNITED STATES OF AMERICA, NASA
8	CENTRE ELECTRONIQUE HORLOGER, S.A.
8*	NIPPON TELEGRAPH AND TELEPHONE PUBLIC CORP.
8	SHELL OIL CO.
7	AGENCE NATIONALE DE VALORISATION DE LA RECHERCHE (ANVAR)
7	ALLEN-BRADLEY CO.
7	AMERICAN MICRO-SYSTEMS, INC.
7	BENDIX CORP.
7	INTERNATIONAL TELEPHONE AND TELEGRAPH CORP.
7	TELEFUNKEN PATENTVERWERTUNGSGESELLSCHAFT MBH

*Composite Total. See Appendix A.

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

ADVANCED MEMORY SYSTEMS INC.
- 3795898 - RANDOM ACCESS READ/WRITE SEMICONDUCTOR MEMORY
- 3801964 - SEMICONDUCTOR MEMORY WITH ADDRESS DECODING

ADVANCED MICRO DEVICES, INC.
- 3986045 - HIGH SPEED LOGIC LEVEL CONVERTER
- 4215282 - TEMPERATURE COMPENSATED SENSE AMPLIFIER FOR PROMS AND THE LIKE

AERONUTRONIC FORD CORPORATION (FORMERLY PHILCO-FORD CORP.)
- 3461314 - HIGH SPEED ANTISATURATING TRANSISTORIZED INVERTER
- 3510787 - VERSATILE LOGIC CIRCUIT MODULE
- 3576447 - DYNAMIC SHIFT REGISTER

AGENCE NATIONALE DE VALORISATION DE LA RECHERCHE (ANVAR)
- 3444392 - BURST INPUT REACTANCE COUPLED ASYNCHRONOUS LOGIC CIRCUIT
- 3508078 - FAIL-SAFE TYPE LOGIC CIRCUIT SYSTEM
- 3766372 - METHOD OF CONTROLLING HIGH ELECTRIC FIELD DOMAIN IN BULK SEMICONDUCTOR
- 3836989 - BULK SEMICONDUCTOR DEVICE
- 4021680 - SEMICONDUCTOR DEVICE
- 4047199 - SEMICONDUCTOR DEVICE
- 4107718 - BULK SEMICONDUCTOR LOGIC DEVICE

A.G. FUR INDUSTRIELLE ELEKTRONIK AGIE LOSONE B. LOCARNO
- 3961270 - APPARATUS COMPRISING A PLURALITY OF SEPARATE PARTS, AND CONTROL APPARATUS FOR PRODUCING SYNCHRONIZING CONTROL SIGNALS FOR SAID SEPARATE PARTS

ALBISWERK ZURICH AG
- 3673433 - CIRCUIT ARRANGEMENT FOR SELECTIVELY CONNECTING AT LEAST TWO INPUTS TO A COUNTING STAGE POSSESSING AT LEAST ONE PREPARATORY INPUT AND ONE TRIGGERING INPUT AND INCLUDING CONTACT BOUNCE SUPPRESSION CIRCUITRY

ALLEN-BRADLEY COMPANY
- 3466602 - SINGLE ERROR DETECTOR FOR BINARY INFORMATION
- 3575637 - GATE-CONTROLLED PHASE FAILURE PROTECTION CIRCUIT
- 3643115 - INTERFACE CIRCUIT FOR INDUSTRIAL CONTROL SYSTEMS
- 3743855 - FAULT DETECTING AND FAULT PROPAGATING LOGIC GATE
- 3751684 - FAULT MODE DETECTION SYSTEM
- 3992636 - DIGITAL INPUT CIRCUIT WITH FAULT DETECTION MEANS
- 4039855 - SOLID STATE RELAY

AMDAHL CORPORATION
- 3792362 - CLOCK APPARATUS AND DATA PROCESSING SYSTEM

AMERICAN MICRO-SYSTEMS, INC.
- 3478229 - MULTIFUNCTION CIRCUIT DEVICE
- 3582674 - LOGIC CIRCUIT
- 3626202 - LOGIC CIRCUIT
- 3651334 - TWO-PHASE RATIOLESS LOGIC CIRCUIT WITH DELAYLESS OUTPUT
- 3783306 - LOW POWER RING COUNTER
- 3924265 - LOW CAPACITANCE V GROOVE MOS NOR GATE AND METHOD OF MANUFACTURE
- 3950654 - POWER-ON INITIALIZING CIRCUIT FOR A CALCULATOR SYSTEM

AMERICAN STANDARD, INC.
- 4320315 - FAIL-SAFE AND GATE CIRCUIT

ANALOG DEVICES, INC.
- 4309693 - SOLID STATE DIGITAL TO ANALOG CONVERTER

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

ANALOG OEVICES, INC. (CONTINUEO)
4323795 - BIAS CURRENT NETWORK FOR IC OIGITAL-TO-ANALOG CONVERTERS ANO THE LIKE

APPLIEO OYNAMICS, INC.
3488478 - GATING CIRCUIT FOR HYBRIO COMPUTER APPARATUS

ARBEITSSTELLE FUR MOLEKULARELEKTRONIK KONIGSBRUCKER -
3562548 - CIRCUIT ARRANGEMENT WITH SEMICONOUCTOR ELEMENTS
3562549 - SEMICONOUCTOR LOGIC CIRCUIT
3610949 - CIRCUIT FOR PERFORMING LOGIC FUNCTIONS

ARTECHE, INSTRUMENTACION Y SISTEMAS ELECTRONICOS, S.A.
3899690 - CONTROL OEVICE OETECTING SIGNAL OEVIATIONS FROM THRESHOLD VALUES

ATLANTIC RICHFIELO COMPANY
3619793 - OIGITAL WAVEFORM GENERATOR WITH ADJUSTABLE TIME SHIFT AND AUTOMATIC PHASE CONTROL

AUTOMATIC ELECTRIC LABORATORIES INC.
3478314 - TRANSISTORIZEO EXCLUSIVE-OR COMPARATOR

AVCO CORPORATION
3423728 - OECOOING ARRANGEMENT WITH MAGNETIC INHIBITOR MEANS FOR PROVIOING A FAIL-SAFE COMMAND SIGNAL

BAUSCH & LOMB INCORPORATED
3508198 - BINARY COMPARATOR CIRCUIT

BELL CANAOA-NORTHERN ELECTRIC RESEARCH LIMITEO
3723760 - TRANSMISSION GATING CIRCUIT

BELL TELEPHONE LABORATORIES INCORPORATEO
3440493 - ERROR OETECTION CIRCUIT
3458718 - LOGIC SYSTEM INCLUOING AN EMITTER-FOLLOWER AMPLIFIER HAVING A TWO-TERMINAL CURRENT-LIMITING OEVICE CON- NECTEO BETWEEN I TS EMITTER ELECTROOE ANO A POINT OF REFERENCE POTENTIAL
3458822 - CLOCK PULSE FAILURE OETECTOR
3462613 - ANTICOINCIOENCE CIRCUIT
3479524 - MULTIPLE COUNTER STAGE USING COINCIDENCE GATES TO COORDINATE INPUT SIGNALS ANO FEEOBACK SIGNALS WITHIN THE STAGE
3479603 - PLURALITY OF SOURCES CONNECTEO IN PARALLEL TO PRODUCE A TIMING PULSE OUTPUT WHILE ANY SOURCE IS OPERATIVE
3484700 - ASYNCHRONOUS SEQUENTIAL SWITCHING CIRCUIT USING NO OELAY ELEMENTS
3484701 - ASYNCHRONOUS SEQUENTIAL SWITCHING CIRCUIT USING A SINGLE FEEOBACK DELAY ELEMENT
3509365 - ANTICOINCIDENCE CIRCUIT
3558929 - BIPOLAR PULSE REGENERATOR
3571727 - ASYNCHRONOUS SEQUENTIAL DIVIDE BY THREE LOGIC CIRCUIT
3576445 - TRANSISTOR LOGIC ARRANGEMENTS
3590230 - FULL ADOER EMPLOYING EXCLUSIVE-NOR CIRCUITRY
3597626 - THRESHOLO LOGIC GATE
3603818 - GUNN-OIOOE LOGIC CIRCUITS
3611318 - SEMICONDUCTOR STORAGE APPARATUS
3617779 - ELECTROMAGNETIC ENERGY LOGIC EMPLOYING SATURABLE ABSORBERS
3619583 - MULTIPLE FUNCTION PROGRAMMABLE ARRAYS
3624424 - VARIABLE-HYSTERESIS BINARY TRIGGER
3629609 - TTL INPUT ARRAY WITH BYPASS OIOOE
3694666 - TRANSISTOR LOGIC CIRCUITS
3704383 - TRANSISTOR-TRANSISTOR LOGIC CLIPPING CIRCUIT
3714460 - EXCLUSIVE OR CIRCUIT
3716728 - MINIMUM OELAY DATA TRANSFER ARRANGEMENT
3720821 - THRESHOLD LOGIC CIRCUITS

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

BELL TELEPHONE LABORATORIES INCORPORATED (CONTINUED)
3725793 - CLOCK SYNCHRONIZATION ARRANGEMENT EMPLOYING DELAY DEVICES
3727076 - LOW POWER DIGITAL CIRCUIT UTILIZING AVALANCHE BREAKDOWN
3731073 - PROGRAMMABLE SWITCHING ARRAY
3769499 - THRESHOLD LOGIC THREE-INPUT ADDER
3796896 - TRANSISTOR LOGIC CIRCUIT
3798466 - CIRCUITS INCLUDING COMBINED FIELD EFFECT AND BIPOLAR TRANSISTORS
3814951 - MULTIPLE FUNCTION LOGIC CIRCUIT
3825771 - IGFET INVERTER CIRCUIT
3839646 - FIELD EFFECT TRANSISTOR LOGIC GATE WITH IMPROVED NOISE MARGINS
3851186 - DECODER CIRCUIT
3859641 - DYNAMIC BUFFER CIRCUIT
3866066 - POWER SUPPLY DISTRIBUTION FOR INTEGRATED CIRCUITS
3898616 - THRESHOLD LOGIC CIRCUIT FOR DETECTING EXACTLY M OUT OF A SET OF N SIGNALS
3899694 - COMPENSATING REFERENCE VOLTAGE CIRCUIT FOR SEMICONDUCTOR APPARATUS
3903474 - PERIODIC PULSE CHECK CIRCUIT
3912914 - PROGRAMMABLE SWITCHING ARRAY
3919564 - CHARGE TRANSFER LOGIC GATE
3934157 - TTL CIRCUIT
3935477 - ANALOG INVERTER FOR USE IN CHARGE TRANSFER APPARATUS
3944850 - CHARGE TRANSFER DELAY LINE FILTERS
3958136 - LEVEL SHIFTER CIRCUIT
3962590 - TTL COMPATIBLE LOGIC GATE CIRCUIT
3964030 - SEMICONDUCTOR MEMORY ARRAY
4007384 - NONINVERTING CURRENT-MODE LOGIC GATE
4037115 - BIPOLAR SWITCHING TRANSISTOR USING A SCHOTTKY DIODE CLAMP
4051393 - CURRENT SWITCHED JOSEPHSON JUNCTION MEMORY AND LOGIC CIRCUITS
4054803 - MATCHER CIRCUIT
4076556 - METHOD FOR FABRICATION OF IMPROVED BIPOLAR INJECTION LOGIC CIRCUIT
4208728 - PROGRAMABLE LOGIC ARRAY
4217600 - CHARGE TRANSFER LOGIC APPARATUS
4228528 - MEMORY WITH REDUNDANT ROWS AND COLUMNS
4249094 - RELAXATION OSCILLATION LOGIC IN JOSEPHSON JUNCTION CIRCUITS
4251884 - PARITY CIRCUITS
4275313 - CURRENT LIMITING OUTPUT CIRCUIT WITH OUTPUT FEEDBACK
4275314 - JOSEPHSON ATTO-WEBER SWITCH
4284905 - IGFET BOOTSTRAP CIRCUIT
4291247 - MULTISTAGE LOGIC CIRCUIT ARRANGEMENT
4309630 - BUFFER CIRCUITRY
4309768 - MISMATCH DETECTION CIRCUIT FOR DUPLICATED LOGIC UNITS
4330722 - CLOCKED IGFET LOGIC CIRCUIT

BENDIX CORPORATION
3465134 - SOLID STATE MICROCIRCUIT INTEGRATOR SYNCHRONIZER SYSTEM
3467956 - CROSSVOTER MONITOR SYSTEM
3576446 - PULSE GATE
3579120 - SELF-TESTING LOGIC GATE
3676687 - SHADOW EDGE POSITION DETECTOR USING LINEAR ARRAY OF DIODES WITH LOGIC TO GENERATE GRAY CODE
3697139 - SKID CONTROL SYSTEM MAXIMUM CYCLIC LIMITER
3962647 - BIPHASE WAVEFORM GENERATOR USING SHIFT REGISTERS

BLISS, E. W.,COMPANY
3430069 - TRAFFIC CONTROLLER TIMING CIRCUIT
3457430 - ANTI-COINCIDENCE LOAD CONTROL CIRCUIT

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

BOOENSEEWERK GERAETETECHNIK, GMBH
3610950 - SIGNAL SELECTION CIRCUIT

BOLKOW GESELLSCHAFT MIT BESCHRANKTER HAFTUNG
3482132 - LOGICAL NETWORK

BULOVA WATCH COMPANY, INC.
3913026 - MOS TRANSISTOR GAIN BLOCK

BUNKER RAMO CORPORATION
3420992 - BINARY AOOER EMPLOYING NEGATIVE RESISTANCE OIOOES
3522445 - THRESHOLO ANO MAJORITY GATE ELEMENTS ANO LOGICAL ARRANGEMENTS THEREOF
3576984 - MULTI-FUNCTION LOGIC NETWORK
3582683 - OPTIONALLY CLOCKEO TRANSISTOR CIRCUITS
3603816 - HIGH SPEEO OIGITAL CIRCUITS
3644923 - THRESHOLO ANO MAJORITY GATE ELEMENTS ANO LOGICAL ARRANGEMENTS THEREOF

BURROUGHS CORPORATION
3428830 - START-STOP LOGICAL SWITCHING SYSTEM
3458717 - REAO-IN ORIVER
3471789 - SINGLE PULSE SWITCH LOGIC CIRCUIT
3508079 - LOGIC SENSING CIRCUIT WITH SINGLE PUSHBUTTON OPERATION
3510784 - CONVERTIBLE TIMING CIRCUIT
3534339 - SERVICE REQUEST PRIORITY RESOLVER ANO ENCOOER
3719830 - LOGIC CIRCUIT
3742253 - THREE STATE LOGIC OEVICE WITH APPLICATIONS
3746885 - LOGIC CIRCUIT USING A CURRENT SWITCH TO COMPENSATE FOR SIGNAL OETERIORATION
3749940 - KEYBOARO STROBE FILTER FOR STATIC KEYBOAROS
3753014 - FAST INHIBIT GATE WITH APPLICATIONS
3790959 - CAPACITIVE REAO ONLY MEMORY
3828202 - LOGIC CIRCUIT USING A CURRENT SWITCH TO COMPENSATE FOR SIGNAL OETERIORATION
3866061 - OVERLAP TIMING CONTROL CIRCUIT FOR CONOITIONING SIGNALS IN A SEMICONOUCTOR MEMORY
3916216 - OIGITAL LOGIC CIRCUIT HAVING INTERNAL COMPENSATION FOR SIGNAL OETERIORATION
3921007 - STANOAROIZING LOGIC GATE
3970876 - VOLTAGE ANO TEMPERATURE COMPENSATION CIRCUITRY FOR CURRENT MOOE LOGIC
4145623 - CURRENT MOOE LOGIC COMPATIBLE EMITTER FUNCTION TYPE LOGIC FAMILY
4195358 - OECOOER FOR A PROM
4281258 - HIGH SPEEO, LOW COMPONENT COUNT, CML EXCLUSIVE NOR GATE
4320525 - SELF SYNCHRONIZING CLOCK OERIVATION CIRCUIT FOR OOUBLE FREQUENCY ENCOOEO OIGITAL DATA

CALIFORNIA INSTITUTE OF TECHNOLOGY
3742381 - WIOEBANO OIGITAL PSEUOO-GAUSSIAN NOISE GENERATOR

CANAOIAN PATENTS ANO OEVELOPMENT LIMITEO
3470471 - POLARITY COINCIOENCE CORRELATION METHOO ANO APPARATUS FOR MEASURING ELECTRICAL ENERGY

CANON KABUSHIKI KAISHA
4027305 - SYSTEM FOR ORIVING LIQUIO CRYSTAL DISPLAY OEVICE
4137563 - CIRCUITRY FOR REOUCING POWER OISSIPATION IN EQUIPMENT WHICH OPERATES IN SYNCHRONISM WITH CLOCK PULSES

CASE WESTERN RESERVE UNIVERSIT/
3996560 - SEQUENCING UNIT

CASIO COMPUTER CO. LTO.
4038564 - MULTI-LEVEL VOLTAGE SELECTION CIRCUIT
4324991 - VOLTAGE SELECTOR CIRCUIT

DRGANIZATIDNAL PATENTING (1/69- 6/82) - - ALPHA LISTING

CENTRE ELECTRONIQUE HDRLDGER, S.A.
- 3619646 - FREQUENCY DIVIDER CIRCUIT
- 3700916 - LDGICAL FREQUENCY DIVIDER
- 3829714 - FREQUENCY DIVIDING LDGIC STRUCTURE
- 3928773 - LDGICAL CIRCUIT WITH FIELD EFFECT TRANSISTDRS
- 4041522 - INTEGRATED CIRCUIT AND MANUFACTURE THEREDF
- 4140924 - LDGIC CMDS TRANSISTDR CIRCUITS
- 4227097 - LDGIC D FLIP-FLDP STRUCTURE
- 4230957 - LDGIC JK FLIP-FLDP STRUCTURE

CITIZEN WATCH CD., LTD.
- 3939643 - CRYSTAL-CDNTRDLLED ELECTRDNIC TIMEPIECE WITH CMDS SWITCHING AND FREQUENCY-DIVIDING CIRCUITS
- 3979608 - SDLID STATE BINARY LDGIC SIGNAL SDURCE FDR ELECTRONIC TIMEPIECE DR THE LIKE
- 4024416 - METHDD FDR CDNTRDLLING FREQUENCY DF ELECTRICAL DSCILLATIDNS AND FREQUENCY STANDARD FDR ELECTRDNIC TIMEPIECE
- 4255723 - AMPLITUDE CDNTRDL INVERTER CIRCUIT FDR ELECTRDNIC DEVICE

CDGAR CDRPDRATIDN
- 3614467 - NDN-SATURATED LDGIC CIRCUITS CDMPATIBLE WITH TTL AND DTL CIRCUITS
- 3684897 - DYNAMIC MDS MEMDRY ARRAY TIMING SYSTEM
- 3716722 - TEMPERATURE CDMPENSATIDN FDR LDGIC CIRCUITS
- 3736572 - BIPDLAR DRIVER FDR DYNAMIC MDS MEMDRY ARRAY CHIP
- 3766406 - ECL-TD-TTL CDNVERTER

CDLLINS RADID CDMPANY
- 3506815 - BINARY CDNVERTER
- 3506930 - BROADBAND MULTILEVEL PHASE MDDULATIDN SYSTEM EMPLDYING DIGITALLY CDNTRDLLED SIGNAL REFLECTIDN MEANS
- 3562558 - DELAY LINE CDNTRDL GATED MICROLDGIC CLDCK GENERATDR
- 3562654 - ELECTRDNIC CDUNTER
- 3577006 - FAIL-SAFE PULSED LDGIC AND GATE
- 3596107 - SIGNAL SELECTOR
- 3614591 - FAILSAFE AND/MDNITDR CIRCUIT
- 3631350 - SYNCHRDNDUS CDUNTING APPARATUS
- 3816718 - SYNTHESIS DF FAIL DPERATIDNAL HEADING INFDRMATIDN (CDURSE DATUM) FRDM NDNFAIL DPERATIDNAL INPUT SIGNALS

CDMMISSARIAT A L'ENERGIE ATDMIQUE
- 3569746 - HIGH SPEED NDN SATURATING LDGIC CIRCUIT
- 3662273 - APPARATUS FDR SAMPLING RANDDM PULSE

CDMPAGNIE DE SAINT-GDBAIN-PDNT-A-MDUSSDN
- 3612847 - ELECTRICAL APPARATUS AND METHDD FDR ADDING BINARY NUMBERS

COMPAGNIE DES CDMPTEURS
- 3634771 - FREQUENCY CDMPARATIVE CIRCUIT DF TWD SERIES DF PULSES

CDMPAGNIE DES FREINS ET SEGMAUX WESTINGHDUSE
- 3421018 - AND TYPE FAIL-SAFE LDGIC CIRCUIT
- 3422284 -
- 3428825 - SAFETY LDGIC CIRCUIT OF THE AND TYPE

CDMPAGNIE INDUSTRIELLE DES TELECDMMUNICATIDNS CIT-ALCATEL
- 3795869 - FREQUENCY SDURCE INCLUDING FAULT RESPDNSIVE CDNTRDL

CDMPUTER DESIGN CDRPDRATIDN
- 3668436 - CIRCUIT APPARATUS FDR SUPPLYING FIRST AND SECDND TRAINS DF MUTUALLY EXCLUSIVE CLDCK PULSES

ORGANIZATIDNAL PATENTING (1/69- 6/82) - - ALPHA LISTING

CDNTRDL DATA CDRPDRATIDN
3535546 - CURRENT MDDE LDGIC
3577073 - APPARATUS FOR AUTOMATED CDMPUTER MAINTENANCE CDMPRISING MEANS FDR VARYING THE INPUT SIGNAL SWITCHING THRESHOLD VDLTAGE FDR ANY DF A PLURALITY DF ELECTRDNIC CIRCUITS
3596188 - FOUR PHASE DIGITAL CLOCK
4019144 - CDNDITIDNAL LATCH CIRCUIT

CDNTRDLE BAILEY
4215340 - PRDCESS FOR THE AUTDMATIC SIGNALLING DF FAULTS OF A STATIC AUTDMATIC MODULE AND A MODULE FOR REALIZING THE PRDCESS

CDRNING GLASS WDRKS
3471713 - HIGH-SPEED LDGIC MDDULE HAVING PARALLEL INPUTS, DIRECT EMITTER FEED TD A CDUPLING STAGE AND A GRDUNDED BASE OUTPUT

CSF-CDMPAGNIE GENERALE DE TELEGRAPHIE SANS FIL
3521081 - LDGICAL CIRCUIT ELEMENT CDMPRISING AN MDS FIELD EFFECT TRANSISTDR
3598979 - DIGIT SEQUENCE CDRRELATDR

CURRENT CONTRDL DEVICES, INC.
3458759 - REMDTE CONTRDL LIGHTING SYSTEM

CUTLER-HAMMER INC.
4038562 - LADDER STATIC LOGIC CDNTRDL SYSTEM AND METHOD DF MAKING

DATA GENERAL CDRPDRATIDN
4023047 - MDS PULSE-EDGE DETECTDR CIRCUIT

DELAWARE SDS, INC., MESNE
3622803 - CIRCUIT NETWDRK INCLUDING INTEGRATED CIRCUIT FLIP-FLDPS FDR DIGITAL DATA PROCESSING SYSTEMS

DESIGN + MANUFACTURING CDRPORATIDN
3774056 - CDNTRDL CIRCUIT FOR APPLIANCES AND THE LIKE

DI/AN CONTRDLS, INC.
3540016 - MAGNETIC STDRAGE INTEGRATED CIRCUIT FDR PERFDRMING LOGICAL FUNCTIDNS

DIGITAL EQUIPMENT CDRPORATIDN
3571615 - LDGIC CIRCUIT
3609409 - DATA TRANSMISSIDN CIRCUIT

DIXI S.A.
3517326 - GATE RELAXATIDN OSCILLATOR
3786276 - INTERFERENCE SUPPRESSIDN DEVICE FOR LDGIC SIGNALS

DYAD SYSTEMS, INC.
3736575 - SINGLE LINE PER BIT ASYNCHRDNOUS CIRCUIT AND SYSTEM

EBAUCHES S.A.
3629709 - ELECTRDNIC FREQUENCY CDNVERTER
4313064 - INTEGRATED CIRCUIT DETECTING THE CHARACTERISTIC OF AN EXTERNAL SYSTEM

ELECTRIC MACHINERY MANUFACTURING COMPANY
3535545 - ANNUNCIATDR AND CDNTRDL SYSTEM WITH SPECIFIC APPLICATION TO INTERNAL CDMBUSTIDN ENGINES

ELECTRD-CDRPORATIDN
3697779 - FUNCTION CDNTRDL

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

ELECTRONIC PROCESSORS, INC.
3742468 - MEANS FOR THE RELIABLE TRANSMISSION OF OIGITAL SIGNALS ACROSS SLIP RINGS ANO THE LIKE

ELECTRONICS ARRAYS, INC.
3602736 - MOS RATIOLESS REGISTER STAGE
3609406 - INTEGRATED CIRCUIT INVERTER
3665422 - INTEGRATED CIRCUIT, RANDOM ACCESS MEMORY
3927334 - MOSFET BISTRAP BUFFER

ELECTRONICS ASSOCIATES, INC.
3454310 - BOOLIAN CONNECTIVE SYSTEM
3483530 - OISCRETE BISTABLE DITITAL MEMORY SYSTEM

EMHART INOUSTRIES, INC.
3731205 - SEQUENCE OETECTOR CIRCUIT

EMTEC OESIGNS, INC.
3551822 - TIMING OEVICE FOR GENERATING A PLURALITY OF CONTROLLABLE PULSE TRAINS

ENGLISH ELECTRIC COMPANY LIMITEO
3469196 - ELECTRICAL SIGNAL PHASE COMPARATOR

ENGLISH ELECTRIC COMPUTERS LIMITEO
3448288 - TRANSISTOR LOGICAL CIRCUIT ARRANGEMENTS

FAIRCHILO CAMERA AND INSTRUMENT CORPORATION
3590274 - TEMPERATURE COMPENSATEO CURRENT-MOOE LOGIC CIRCUIT
3622799 - TEMPERATURE COMPENSATED CURRENT-MODE CIRCUIT
3636376 - LOGIC NETWORK WITH A LOW POWER SHIFT REGISTER
3639781 - SERIES GATEO MULTIPLEXER CIRCUIT
3717770 - HIGH-DENSITY LINEAR PHOTOSENSOR ARRAY
3969719 - ELECTRONIC WATCH
4041326 - HIGH SPEED COMPLEMENTARY OUTPUT EXCLUSIVE OR/NOR CIRCUIT
4131808 - TTL TO MOS ORIVER CIRCUIT
4172291 - PRESET CIRCUIT FOR INFORMATION STORAGE DEVICES
4214175 - HIGH-PERFORMANCE AOORESS BUFFER FOR RANOOM-ACCESS MEMORY
4255670 - TRANSISTOR LOGIC TRISTATE OUTPUT WITH FEEDBACK
4287433 - TRANSISTOR LOGIC TRISTATE OUTPUT WITH REOUCED POWER DISSIPATION
4308470 - OIGITAL-TO-ANALOG SWITCHING INTERFACE CIRCUIT
4311927 - TRANSISTOR LOGIC TRISTATE DEVICE WITH REOUCEO OUTPUT CAPACITANCE
4321490 - TRANSISTOR LOGIC OUTPUT FOR REDUCEO POWER CONSUMPTION ANO INCREASEO SPEEO DURING LOW TO HIGH TRANSITION
4330723 - TRANSISTOR LOGIC OUTPUT OEVICE FOR DIVERSION OF MILLER CURRENT
4334157 - OATA LATCH WITH ENABLE SIGNAL GATING

FERRANTI LIMITED
4049975 - TRANSISTOR CIRCUITS
4069494 - INVERTER CIRCUIT ARRANGEMENTS
4145621 - TRANSISTOR LOGIC CIRCUITS

FERROXCUBE CORPORATION OF AMERICA
3648060 - TRANSISTORIZEO CURRENT SWITCH FOR MEMORY SYSTEMS

FORINGER ANO COMPANY, INC.
3492500 - SOLID STATE CONTROL MOOULES HAVING OPTIMIZED COMPATABILITY WITH ELECTROMECHANICAL COMPONENTS AND SYSTEMS

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

FOUR-PHASE SYSTEMS, INC.
3702945 - MOS CIRCUIT WITH NOOAL CAPACITOR PREDISCHARGING MEANS

FUJITSU FANUC LIMITEO
4267464 - OECOOER CIRCUIT

FUJITSU LIMITED
3445811 - ERROR SYSTEM FOR LOGIC CIRCUITS
3952254 - TIMING SIGNAL REGENERATING CIRCUIT
4091293 - MAJORITY DECISION LOGIC CIRCUIT
4145749 - LOG IN-OUT SYSTEM FOR LOGIC APPARATUS
4156939 - INTEGRATED SEMICONDUCTOR MEMORY OEVICE
4185320 - OECODER CIRCUIT
4233525 - ELECTRONIC CIRCUIT FOR USE IN A DIGITAL CIRCUIT WHICH PREVENTS PASSAGE OF PULSES HAVING A PULSE WIDTH NARROWER THAN A PR EDETERMINED VALUE
4247921 - OECODER
4255672 - LARGE SCALE SEMICONDUCTOR INTEGRATEO CIRCUIT DEVICE
4278897 - LARGE SCALE SEMICONDUCTOR INTEGRATED CIRCUIT OEVICE
4291326 - SEMICONDUCTOR OEVICE
4322640 - THREE-STATE OUTPUT CIRCUIT
4336465 - RESET CIRCUIT

FURUND ELECTRIC CO., LTO.
4095128 - PUSH-PULL SWITCHING CIRCUIT WITH MINORITY CARRIER STORAGE DELAY

GENERAL DYNAMICS CORPORATION
3443122 - GATING CIRCUIT UTILIZING JUNCTION TYPE FIELO EFFECT TRANSISTOR AS INPUT ORIVER TO GATE DRIVER
3496493 - TERNARY LOGIC SYSTEM ADAPTED FOR ANTENNA TUNING
3509476 - OIGITAL FREQUENCY AND/OR PHASE MEASURING SYSTEM HAVING WIOE OYNAMIC RANGE
3558913 - RAPID SWITCHING LOGIC GATES
3618044 - INFORMATION HANDLING SYSTEM ESPECIALLY FOR MAGNETIC RECORDING AND REPROOUCING OF DIGITAL OATA

GENERAL ELECTRIC COMPANY
3430064 - CRYOTRON LOGIC CIRCUIT
3510679 - HIGH SPEED MEMORY AND MULTIPLE LEVEL LOGIC NETWORK
3514640 - MEMORY FLIP-FLOP
3539824 - CURRENT-MOOE DATA SELECTOR
3573489 - HIGH SPEEO CURRENT-MOOE LOGIC GATE
3599016 - AUTOMATIC RESET CIRCUIT
3639901 - ERROR CORRECTING OECOOER UTILIZING ESTIMATOR FUNCTIONS AND OECISION CIRCUIT FOR BIT-BY-BIT OECODING
3748540 - TESTING AND MONITORING SYSTEM FOR REDUNOANT TRIP OEVICES
3750115 - READ MOSTLY ASSOCIATIVE MEMORY CELL FOR UNIVERSAL LOGIC
3755692 - EXCLUSIVE-OR LOGIC CIRCUIT
3774051 - SOLID STATE CIRCUITS FOR AND METHOO OF SIMULATING RELAY LOGIC
3816725 - MULTIPLE LEVEL ASSOCIATIVE LOGIC CIRCUITS
3849638 - SEGMENTEO ASSOCIATIVE LOGIC CIRCUITS
3857101 - VARIABLE BURST LENGTH WAVEFORM GENERATOR
3914590 - SERIAL TWO'S COMPLEMENTER
3956704 - PULSE GENERATING MEANS
4001654 - TESTABLE PROTECTIVE SYSTEM
4109169 - AVALANCHE MEMORY TRIODE AND LOGIC CIRCUITS
4154395 - REOUNDANT SIGNAL CIRCUIT
4196360 - INTERFACE DRIVER CIRCUIT
4199799 - SUPERVISORY CIRCUIT FOR REDUNDANT CHANNEL CONTROL SYSTEMS
4225795 - COINCIOENCE CIRCUIT FOR A PROTECTIVE RELAY CIRCUIT

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

GENERAL INSTRUMENT CORPORATION
- 3517210 - FET OYNAMIC DATA INVERTER
- 3609392 - OYNAMIC SHIFT REGISTER SYSTEM HAVING OATA RATE OOUBLING CHARACTERISTIC
- 3611437 - READ-ONLY MEMORY WITH OPERATIVE AND INOPERATIVE DATA DEVICES LOCATEO AT AOORESS STATIONS AND WITH MEANS FOR CONTROLLABLY CHARGING AND OISCHARGING APPROPRIATE MODES OF THE AOORESS STATIONS
- 3638036 - FOUR-PHASE LOGIC CIRCUIT
- 3644904 - CHIP SELECT CIRCUIT FOR MULTI-CHIP RANOOM ACCESS MEMORY
- 3657557 - SYNCHRONOUS BINARY COUNTER
- 3678293 - SELF-BIASING INVERTER
- 3736521 - MOS AMPLIFIER UTILIZING PARASITIC CONOUCTION STATE OPERATION
- 3794856 - LOGICAL BOOTSTRAPPING IN SHIFT REGISTERS
- 3798617 - PERMANENT STORAGE MEMORY AND MEANS FOR ADDRESSING
- 3812520 - PARASITIC TRANSISTOR SHIFT REGISTER
- 3925689 - HIGH SPEEO OATA BUFFER AND AMPLIFIER
- 3956640 - BUFFER AMPLIFIER FOR RIPPLE-CARRY BINARY GENERATOR
- 3986046 - DUAL TWO-PHASE CLOCK SYSTEM

GENERAL INSTRUMENT MICROELECTRONICS LTD.
- 3644750 - TWO-PHASE LOGIC CIRCUIT

GENERAL MOTORS CORPORATION
- 3629620 - SINGLE LOGIC GATE MONOSTABLE MULTIVIBRATOR

GENERAL PRECISION SYSTEMS INC.
- 3544905 - MULTIPLE MATCH RESOLVING NETWORK

GENERAL SIGNAL CORPORATION
- 3569730 - LOGIC CIRCUITRY FOR RAILROAD CROSSING SYSTEMS
- 3725680 - APPARATUS FOR OIGITIZING NOISY TIME OURATION SIGNALS WHICH PREVENTS AOVERSE EFFECTS OF CONTACT BOUNCE
- 3825744 - OVERSPEEO DETECTOR FOR VEHICLE CONTROL SYSTEM
- 3909632 - FAIL-SAFE LOGIC CIRCUITRY FOR VEHICLE TRANSPORTATION CONTROL
- 3995173 - SOLID STATE FAIL-SAFE LOGIC SYSTEM
- 4097764 - FAIL-SAFE SOLIO STATE LOGIC

GESELLSCHAFT ZUR FORDERUNG OER FORSCHUNG AN DER EIOGENOSSISC
- 3617778 - ELECTRONIC CIRCUIT ARRANGEMENT WITH AT LEAST ONE INTEGRATED ELECTRONIC CIRCUIT UTILIZING CONSTANT CURRENT SOURCES IN CONNECTION WITH GALVANIC COUPLING BETWEEN TRANSISTOR STAGES COUPLED WITH EACH OTHER IN LIEU OF HIGH OHMIC RESISTORS

GIDDINGS + LEWIS, INC.
- 4331893 - BOOLEAN LOGIC PROCESSOR WITHOUT ACCUMULATOR OUTPUT FEEDBACK

GTE AUTOMATIC ELECTRIC (CANAOA) LIMITED
- 4078204 - DI-PHASE PULSE RECEIVING SYSTEM

GTE AUTOMATIC ELECTRIC LABORATORIES INCORPORATED
- 3588622 - O.C. CABLE ORIVER CIRCUIT FREE FROM VOLTAGE VARIATIONS BETWEEN SEPARATEO GROUNDS
- 3668423 - LOGIC CIRCUIT DELAY SYSTEM COMPRISING MONOSTABLE MEANS FOR PROVIDING DIFFERENT TIME OELAYS FOR POSITIVE AND NEGATIVE TRANSITIONS
- 3787735 - LOGIC OETECTOR APPARATUS
- 3829790 - CLOCK DISTRIBUTION CIRCUIT
- 3943454 - DIGITAL LOGIC CIRCUITS FOR PRODUCING OIGITAL SUM AND OIFFERENCE FREQUENCIES
- 4045693 - NEGATIVE R-S TRIGGERED LATCH
- 4207534 - FAST REOUNDANT PULSE OENSITY ANALYZER
- 4308472 - CLOCK CHECK CIRCUIT

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

GTE LABORATORIES INCORPDRATED
- 3935475 - TWO-PHASE MOS SYNCHRONIZER
- 4023050 - LOGIC LEVEL CDNVERTER
- 4157589 - ARITHMETIC LOGIC APPARATUS
- 4307308 - OIGITAL SIGNAL CONVERSION CIRCUIT
- 4311926 - EMITTER COUPLED LDGIC PROGRAMMABLE LDGIC ARRAYS

GTE PRODUCTS CORPDRATION
- 4228370 - BISTABLE MULTIVIBRATOR WITH TRIGGER STEERING

GTE SYLVANIA INCORPORATED
- 3473047 - HIGH SPEED OIGITAL LOGIC CIRCUIT HAVING NDN- SATURATING OUTPUT TRANSISTOR
- 3524992 - TRANSISTOR LOGIC CIRCUIT
- 3560761 - TRANSISTOR LDGIC CIRCUIT
- 3602735 - PULSE SHAPING CIRCUIT FOR USE IN INTEGRATEO CIRCUIT NETWDRKS
- 3662191 - MEMORY ORIVE CIRCUIT

HARRIS CORPORATIDN
- 4069429 - IGFET CLOCK GENERATOR
- 4121203 - METHDD OF MULTIPLEXING LIQUIO CRYSTAL OISPLAYS
- 4163907 - THREE LOGIC STATE INPUT BUFFERS
- 4199731 - REVERSABLE ELECTRICALLY ALTERABLE AMPLIFIER CDNFIGURATIONS
- 4240094 - LASER-CONFIGURED LOGIC ARRAY
- 4301383 - COMPLEMENTARY IGFET BUFFER WITH IMPROVED BIPDLAR OUTPUT

HARRIS SEMICONDUCTOR
- 4192016 - CMOS-BIPOLAR EAROM

HASLER AG
- 3581112 - ELECTRONIC RELAY

HAUNI-WERKE KDRBER + CO. KG
- 3874391 - METHDO AND MEANS FOR REGULATING THE OPERATION OF APPARATUS FOR THE PRODUCTION AND PRDCESSING OF CIGARETTES OR THE LIKE

HAYAKAWA OENKI KOGYD KABUSHIKI KAISHA
- 3569729 - INTEGRATED FET STRUCTURE WITH SUBSTRATE BIASING MEANS TD EFFECT BIDIRECTIONAL TRANSISTOR OPERATION

HEWLETT-PACKARD COMPANY
- 3601631 - BINARY INPUT CONTROLLED GATE CIRCUIT FOR ANALOG TYPE SIGNALS
- 3643109 - LOGIC GATE
- 3649852 - TRIGGER CIRCUIT UTILIZING A PAIR OF LOGIC GATES CDUPLED IN PARALLEL CURRENT PATHS
- 3795822 - MULTIEMITTER COUPLEO LDGIC GATE
- 3965367 - MULTIPLE OUTPUT LOGIC CIRCUITS
- 4017740 - SYNCHRONIZATION OF OIGITAL CIRCUITS BY BUS TRIGGERING
- 4017801 - LOW FREQUENCY TRIANGULAR WAVEFORM GENERATOR
- 4045684 - INFORMATION TRANSFER BUS CIRCUIT WITH SIGNAL LDSS CDMPENSATION
- 4054788 - MDOULAR BINARY HALF-ADDER
- 4103182 - PROGRAMMABLE TRANSFER GATE ARRAY
- 4142251 - FIELO PROGRAMMABLE READ-ONLY-MEMORY
- 4224534 - TRI-STATE SIGNAL CONOITIONING METHOO ANO CIRCUIT

HITACHI, LTD.
- 3450896 - TRANSISTOR SWITCHING CIRCUIT HAVING COMPENSATING CIRCUIT
- 3562560 - TRANSISTOR-TRANSISTOR LOGIC
- 3564281 - HIGH SPEEO LOGIC CIRCUITS AND METHDD OF CONSTRUCTING THE SAME
- 3599000 - SEMICONDUCTOR OPTOELECTRDNIC LOGIC ELEMENT UTILIZEO THE GUNN EFFECT

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

HITACHI, LTD. (CONTINUED)

3700981 - SEMICONDUCTOR INTEGRATED CIRCUIT COMPOSED OF CASCADE CONNECTION OF INVERTER CIRCUITS
3723761 - EMITTER-EMITTER COUPLED LOGIC CIRCUIT DEVICE
3758791 - CURRENT SWITCH CIRCUIT
3760200 - SEMICONDUCTOR INTEGRATED CIRCUIT
3778646 - SEMICONDUCTOR LOGIC CIRCUIT
3818252 - UNIVERSAL LOGICAL INTEGRATED CIRCUIT
3825888 - DECODER CIRCUIT
3832578 - STATIC FLIP-FLOP CIRCUIT
3851185 - BLANKING CIRCUIT
3852625 - SEMICONDUCTOR CIRCUIT
3870897 - DIGITAL CIRCUIT
3889135 - BOOTSTRAP CIRCUIT EMPLOYING INSULATED GATE TRANSISTORS
3896430 - DRIVING SYSTEM OR LIQUID CRYSTAL DISPLAY DEVICE
3909636 - SEMICONDUCTOR LARGE SCALE INTEGRATED CIRCUIT CHIP HAVING CURRENT SWITCHING TYPE LOGICAL CIRCUITS
3916217 - INTEGRATED LOGICAL CIRCUIT DEVICE
3917958 - MISFET (METAL -INSULATOR-SEMICONDUCTOR FIELD-EFFECT TRANSISTOR) LOGICAL CIRCUIT HAVING OEPLETION TYPE LOAD TRANSISTOR
3925686 - LOGIC CIRCUIT HAVING COMMON LOAD ELEMENT
3936676 - MULTI-LEVEL VOLTAGE SUPPLY CIRCUIT FOR LIQUID CRYSTAL DISPLAY DEVICE
3953744 - CIRCUIT FOR CONVERTING AN ASYNCHRONOUS SIGNAL WITH A LDNG TRANSITION TIME TO A SYNCHRONIZED SIGNAL
3955098 - SWITCHING CIRCUIT HAVING FLOATING GATE MIS LOAD TRANSISTORS
3965369 - MISFET (METAL-INSULATOR-SEMICONDUCTOR FIELD-EFFECT TRANSISTOR) LOGICAL CIRCUIT HAVING DEPLETION TYPE LOAD TRANSISTOR
3975649 - ELECTRONIC CIRCUIT USING FIELD EFFECT TRANSISTOR WITH CDMPENSATION MEANS
3980899 - WORD LINE DRIVER CIRCUIT IN MEMORY CIRCUIT
3983420 - SIGNAL GENERATOR CIRCUIT
3983619 - LARGE SCALE INTEGRATED CIRCUIT ARRAY OF UNIT CELLS AND METHOD OF MANUFACTURING SAME
3988616 - DRIVER CIRCUIT FOR LIQUID CRYSTAL DISPLAY USING INSULATED GATE FETS
3991326 - MISFET SWITCHING CIRCUIT FOR A HIGH WITHSTAND VOLTAGE
4008406 - ELECTRONIC CIRCUIT USING FIELD EFFECT TRANSISTOR WITH COMPENSATION MEANS
4011402 - SCANNING CIRCUIT TO DELIVER TRAIN OF PULSES SHIFTED BY A CDNSTANT DELAY ONE AFTER ANOTHER
4016430 - MIS LOGICAL CIRCUIT
4031409 - SIGNAL CONVERTER CIRCUIT
4031410 - THREE-STATE DISCERNMENT CIRCUIT
4040015 - COMPLEMENTARY MOS LOGIC CIRCUIT
4042839 - LOW POWER DISSIPATION COMBINED ENHANCEMENT DEPLETION SWITCHING DRIVER CIRCUIT
4053791 - LOGIC CIRCUIT OF RATIOLESS STRUCTURE
4063118 - MIS DECODER PROVIDING NON-FLOATING OUTPUTS WITH SHORT ACCESS TIME
4069427 - MIS LOGIC CIRCUIT OF RATIOLESS TYPE
4069430 - MIS SWITCHING CIRCUIT CAPABLE OF ENDURING HIGH VOLTAGE
4084105 - LSI LAYOUT AND METHOD FOR FABRICATION OF THE SAME
4084107 - CHARGE TRANSFER DEVICE
4100429 - FET LOGIC CIRCUIT FOR THE DETECTION OF A THREE LEVEL INPUT SIGNAL INCLUDING AN UNDETERMINED OPEN LEVEL AS ONE OF THREE L EVELS
4107548 - RATIOLESS TYPE MIS LOGIC CIRCUIT
4161040 - DATA-IN AMPLIFIER FOR AN MISFET MEMORY DEVICE HAVING A CLAMPED OUTPUT EXCEPT DURING THE WRITE OPERATION
4161664 - INPUT CIRCUIT
4183093 - SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE COMPOSED OF INSULATED GATE FIELD-EFFECT TRANSISTOR
4239980 - INTEGRATED CIRCUIT HAVING AN OPERATION VOLTAGE SUPPLYING DEPLETION TYPE MISFET OF HIGH BREAKDOWN VOLTAGE STRUCTURE
4242739 - MEMORY SYSTEM WITH A STABILIZED SENSE AMPLIFIER
4249091 - LOGIC CIRCUIT
4275312 - MOS DECODER LOGIC CIRCUIT HAVING REDUCED POWER CONSUMPTION
4277829 - ERROR PREVENTING DEVICE FOR AN ELECTRONIC ENGINE CONTROL APPARATUS
4280065 - TRI-STATE TYPE DRIVER CIRCUIT
4286173 - LOGICAL CIRCUIT HAVING BYPASS CIRCUIT
4291241 - TIMING SIGNAL GENERATING CIRCUIT
4329597 - LOGIC CIRCUIT

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

HMW INOUSTRIES, INC.
3651340 - CURRENT LIMITING COMPLEMENTARY SYMMETRY MOS INVERTERS

HOKUSHIN ELECTRIC WORKS, LTO.
4034237 - ORIVE CIRCUIT FOR ULTRASONIC LEVEL GAUGE

HONEYWELL INC.
3487376 - PLURAL EMITTER SEMICONOUCTIVE STORAGE OEVICE
3522444 - LOGIC CIRCUIT WITH COMPLEMENTARY OUTPUT STAGE
3553446 - CARRY OETERMINATION LOGIC
3564514 - PROGRAMMABLE LOGIC APPARATUS
3571616 - LOGIC CIRCUIT
3585399 - TWO IMPEOANCE BRANCH TERMINATION NETWORK FOR INTERCONNECTING TWO SYSTEMS FOR BIOIRECTIONAL TRANSMISSION
3604952 - TRI-LEVEL VOLTAGE GENERATOR CIRCUIT
3653034 - HIGH SPEEO OECOOE CIRCUIT UTILIZING FIELO EFFECT TRANSISTORS
3660675 - TRANSMISSION LINE SERIES TERMINATION NETWORK FOR INTERCONNECTING HIGH SPEEO LOGIC CIRCUITS
3751679 - FAIL-SAFE MONITORING APPARATUS
3751681 - MEMORY SELECTION APPARATUS
3860836 - STABILIZATION OF EMITTER FOLLOWERS
3970866 - LOGIC GATE CIRCUITS
4012697 - CLOCK SIGNAL EXTRACTION OURING PLAYBACK OF A SELF-CLOCKING OIGITAL RECOROING
4032796 - LOGIC OOT-ANO GATE CIRCUITS
4084233 - MICROCOMPUTER APPARATUS
4119997 - OOT-ANO LOGIC GATE OEVICE INCLUOING MULTIEMITTER TRANSISTOR
4135103 - LOGIC TRANSITION CIRCUITS
4139781 - LOGIC GATE CIRCUITS
4165470 - LOGIC GATES WITH FORWARO BIASEO OIOOE LOAO IMPEOENCES
4216486 - LIGHT EMITTING ANO LIGHT OETECTING SEMICONOUCTOR OEVICE FOR INTERFACING WITH AN OPTICAL FIBER

HONEYWELL INFORMATION SYSTEMS INC.
3610962 - BIPOLAR RECEIVER
3668432 - LOGIC SENSING CIRCUIT HAVING SWITCH CONTACT ANTI-BOUNCE FEATURE
3710318 - ERROR OETECTION CIRCUIT
3755689 - TWO-PHASE THREE-CLOCK MOS LOGIC CIRCUITS
3757310 - MEMORY AOORESS SELECTION APPARATUS INCLUOING ISOLATION CIRCUITS
3764920 - APPARATUS FOR SAMPLING AN ASYNCHRONOUS SIGNAL BY A SYNCHRONOUS SIGNAL
3769522 - APPARATUS ANO METHOO FOR CONVERTING MOS CIRCUIT SIGNALS TO TTL CIRCUIT SIGNALS
3813650 - METHOO FOR FABRICATING ANO ASSEMBLING A BLOCK-AOORESSABLE SEMICONOUCTOR MASS MEMORY
3900837 - VARIABLY AOORESSABLE SEMICONOUCTOR MASS MEMORY
3925651 - CURRENT MOOE ARITHMETIC LOGIC ARRAY
3925652 - CURRENT MOOE CARRY LOOK-AHEAO ARRAY
3959666 - LOGIC LEVEL TRANSLATOR
3967139 - APPARATUS FOR ENHANCING OUTPUT CHARACTERISTICS OF VOLTAGE ORIVER CIRCUITS
3974402 - LOGIC LEVEL TRANSLATOR
3984702 - N-BIT REGISTER SYSTEM USING CML CIRCUITS
4044330 - POWER STROBING TO ACHIEVE A TRI STATE
4158891 - TRANSPARENT TRI STATE LATCH
4241418 - CLOCK SYSTEM HAVING A OYNAMICALLY SELECTABLE CLOCK PERIOO

HONEYWELL INFORMATION SYSTEMS ITALIA
3691401 - CONVERTIBLE NANO/NOR GATE
3753008 - MEMORY PRE-ORIVER CIRCUIT
3793591 - PULSE GENERATOR
3845330 - BISTABLE ELECTRONIC CIRCUIT

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

HUGHES AIRCRAFT COMPANY
- 3421092 - MULTIRANK MULTISTAGE SHIFT REGISTER
- 3492496 - TRISTABLE MULTIVIBRATOR
- 3604944 - MOSFET COMPARATOR CIRCUIT
- 3609411 - MOSFET LEVEL OETECTOR
- 3659286 - DATA CONVERTING AND CLOCK PULSE GENERATING SYSTEM
- 3786282 - RADIATION HARDENED FLIP FLOP
- 3916215 - PROGRAMMABLE ECL THRESHOLD LOGIC GATE
- 3925684 - UNIVERSAL LOGIC GATE
- 3925691 - CASCODE NODE IOLE CURRENT INJECTION MEANS
- 3955099 - OIODE CONTROLLED IDLE CURRENT INJECTION
- 4002926 - HIGH SPEED DIVIOE-BY-N CIRCUIT
- 4097844 - OUTPUT CIRCUIT FOR A DIGITAL CORRELATOR
- 4237387 - HIGH SPEED LATCHING COMPARATOR
- 4276488 - MULTI-MASTER SINGLE-SLAVE ECL FLIP-FLOP

HYCOM INCORPORATED
- 3935474 - PHASE LOGIC

INOUSTRIAL PATENT DEVELOPMENT CORPORATION
- 3743947 - RELATIVE AMPLITUOE SEPARATION OETECTION GATE

INSELEK INC.
- 3823330 - CIRCUIT FOR SHIFTING ANO AMPLIFYING INPUT VOLTAGES

INSTITUTO VENEZOLANO OE INVESTIGACIONES CIENTIFICAS (IVIC)
- 4292548 - DYNAMICALLY PROGRAMMABLE LOGIC CIRCUITS

INTEGRATEO PHOTOMATRIX LIMITEO
- 3829711 - SHIFT REGISTERS

INTEGRATED TECHNOLOGY CORPORATION
- 4025800 - BINARY FREQUENCY OIVIOER

INTEL CORPORATION
- 3778784 - MEMORY SYSTEM INCORPORATING A MEMORY CELL ANO TIMING MEANS ON A SINGLE SEMICONOUCTOR SUBSTRATE
- 3863230 - MOS MEMORY DECODER CIRCUIT
- 3937983 - MOS BUFFER CIRCUIT
- 3938108 - ERASABLE PROGRAMMABLE READ-ONLY MEMORY
- 3938109 - HIGH SPEED ECL COMPATIBLE MOS-RAM
- 3946369 - HIGH SPEED MOS RAM EMPLOYING OEPLETION LOAOS
- 3959781 - SEMICONDUCTOR RANDOM ACCESS MEMORY
- 4000413 - MOS-RAM
- 4031379 - PROPAGATION LINE AODER AND METHOD FOR BINARY AODITION
- 4038646 - OYNAMIC MOS RAM
- 4048518 - MOS BUFFER CIRCUIT
- 4051358 - APPARATUS ANO METHOO FOR COMPOSING DIGITAL INFORMATION ON A OATA BUS
- 4079462 - REFRESHING APPARATUS FOR MOS OYNAMIC RAMS
- 4087704 - SEQUENTIAL TIMING CIRCUITRY FOR A SEMICONOUCTOR MEMORY
- 4103189 - MOS BUFFER CIRCUIT
- 4203158 - ELECTRICALLY PROGRAMMABLE AND ERASABLE MOS FLOATING GATE MEMORY DEVICE EMPLOYING TUNNELING AND METHOD OF FABRICATING SAM E
- 4250570 - REOUNDANT MEMORY CIRCUIT
- 4264828 - MOS STATIC OECOOING CIRCUIT
- 4306163 - PROGRAMMABLE SINGLE CHIP MOS COMPUTER

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

INTERNATIONAL BUSINESS MACHINES CORPORATION
3427445 - FULL ADDER USING FIELD EFFECT TRANSISTOR OF THE INSULATED GATE TYPE
3428903 - MULTIPURPOSE LOGIC CIRCUIT FOR PERFORMING 254 OUT OF 256 DISCRETE LOGICAL COMBINATIONS OF THREE VARIABLES
3437938 - CLOCK PULSE GENERATOR
3440413 - MAJORITY LOGIC BINARY ADDER
3445682 - SIGNALS EMPLOYING A TRISTABLE TUNNEL DIODE SENSING CIRCUIT
3445924 - METHOD FOR FABRICATING INSULATED-GATE FIELD EFFECT TRANSISTORS HAVING CONTROLLED OPERATING CHARACTERISTICS
3452221 - ELECTRICAL SHOCK WAVE (GUNN EFFECT) LOGICAL APPARATUS
3458719 - THRESHOLD LOGIC SWITCH WITH A FEED-BACK CURRENT PATH
3460132 - PARALLEL TO SERIAL CODE CONVERTER
3475621 - STANDARDIZED HIGH-DENSITY INTEGRATED CIRCUIT ARRANGEMENT AND METHOD
3479523 - INTEGRATED NOR LOGIC CIRCUIT
3483398 - NON-SATURATING INHIBIT SWITCHING CIRCUIT
3491303 - INFORMATION DETECTING APPARATUS
3495095 - SWITCHING CIRCUITS EMPLOYING ESAKI DIODES
3505535 - DIGITAL CIRCUIT WITH ANTISATURATION COLLECTOR LOAD NETWORK
3505539 - LOW NOISE GATED D.C. AMPLIFIER
3509363 - LOGIC SWITCH WITH ACTIVE FEEDBACK NETWORK
3509364 - VIDEO AMPLIFIER PARTICULARLY ADAPTED FOR INTEGRATED CIRCUIT FABRICATION
3509366 - DATA POLARITY LATCHING SYSTEM
3509380 - HIGH SPEED LATCH CIRCUIT ARRANGEMENT FOR DRIVING A UTILIZATION DEVICE
3515998 - REAL-TIME DETECTION OF LATCH RESOLUTION USING THRESHOLD MEANS
3517224 - REGULATED TRANSISTORIZED CURRENT SOURCE HAVING TEMPERATURE COMPENSATION
3518450 - LOGIC CIRCUIT DIRECTIONALLY COMBINING SINGLE PULSES REPRESENTING LOGIC VARIABLES
3519844 - ELECTRO-OPTICAL LOGIC CIRCUITS PERFORMING NOR FUNCTIONS
3519845 - CURRENT MODE EXCLUSIVE-OR INVERT CIRCUIT
3532909 - TRANSISTOR LOGIC SCHEME WITH CURRENT LOGIC LEVELS ADAPTED FOR MONOLITHIC FABRICATION
3535558 - CURRENT OR VOLTAGE SOURCE
3539994 - ADAPTIVE TEMPLATE PATTERN CATEGORIZING SYSTEM
3541348 - UP TO M OUT OF N" LOGIC CIRCUIT
3573635 - PULSE TRANSFER SYSTEM
3584205 - BINARY ARITHMETIC AND LOGIC MANIPULATOR
3585377 - FAIL-SAFE DECODER CIRCUITS
3609705 - MULTIVIBRATOR RESPONSIVE TO NOISY AND NOISELESS SIGNALS
3609712 - INSULATED GATE FIELD EFFECT TRANSISTOR MEMORY ARRAY
3610959 - DIRECT-COUPLED TRIGGER CIRCUIT
3628000 - DATA HANDLING DEVICES FOR RADIX"N 2"OPERATION
3628053 - LOGIC SWITCH WITH VARIABLE THRESHOLD CIRCUIT
3633100 - TESTING OF NON-LINEAR CIRCUITS BY COMPARISON WITH A REFERENCE SIMULATION WITH MEANS TO ELIMINATE ERRORS CAUSED BY CRITIC AL RACE CONDITIONS
3634665 - SYSTEM USE OF SELF-TESTING CHECKING CIRCUITS
3636384 - BASE-TO-EMITTER COMPENSATION FOR CURRENT-SWITCH EMITTER-FOLLOWER CIRCUITS
3648061 - ALL TRANSISTOR LOGIC EMPLOYING TRANSISTORS OF A SINGLE CONDUCTIVITY TYPE
3648066 - THREE-PHASE DYNAMIC SHIFT REGISTER
3656004 - BIPOLAR CAPACITOR DRIVER
3660677 - INTERCHANGER 1 CIRCUITS
3660678 - BASIC TERNARY LOGIC CIRCUITS
3665173 - TRIPLE MODULAR REDUNDANCY/SPARING
3665174 - ERROR TOLERANT ARITHMETIC LOGIC UNIT
3671763 - TERNARY LATCHES
3671764 - AUTO-RESET TERNARY LATCH
3676713 - SATURATION CONTROL SCHEME FOR TTL CIRCUIT
3679915 - POLARITY HOLD LATCH WITH COMMON DATA INPUT-OUTPUT TERMINAL
3693032 - ANTISATURATION TECHNIQUE FOR TTL CIRCUITS
3699362 - TRANSISTOR LOGIC CIRCUIT
3702926 - FET DECODE CIRCUIT

DRGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

INTERNATIONAL BUSINESS MACHINES CDRPORATION (CDNTINUED)

3705357 - MDRPHIC EXCLUSIVE- OR CIRCUITS
3708688 - CIRCUIT FOR ELIMINATING SPURIOUS OUTPUTS OUE TO INTERELECTRODE CAPACITANCE IN ORIVER IGFET CIRCUITS
3716724 - SHIFT REGISTER INCORPORATING COMPLEMENTARY FIELD EFFECT TRANSISTORS
3718826 - FET ADDRESS OECODER
3721838 - REPAIRABLE SEMICONDUCTOR CIRCUIT ELEMENT AND METHDD DF MANUFACTURE
3735358 - SPECIALIZED ARRAY LOGIC
3736574 - PSEUDD-HIERARCHY MEMDRY SYSTEM
3740590 - LATCH CIRCUIT
3740730 - LATCHABLE DECODER DRIVER AND MEMDRY ARRAY
3747064 - FET DYNAMIC LOGIC CIRCUIT AND LAYDUT
3758795 - SUPERCDNOUCTIVE CIRCUITRY USING JOSEPHSDN TUNNELING DEVICES
3761739 - NON-METASTABLE ASYNCHRDNDUS LATCH
3764823 - TIMED TRUE AND COMPLEMENT GENERATDR
3769524 - TRANSISTDR SWITCHING CIRCUIT
3772607 - FET INTERFACE CIRCUIT
3777186 - CHARGE TRANSFER LOGIC OEVICE
3783254 - LEVEL SENSITIVE LOGIC SYSTEM
3784854 - BINARY ADDER USING JDSEPHDSON OEVICES
3787734 - VDLTAGE REGULATOR AND CDNSTANT CURRENT SOURCE FDR A CURRENT SWITCH LOGIC SYSTEM
3787736 - FIELD-EFFECT TRANSISTDR LDGIC CIRCUIT
3801965 - WRITE SUPPRESSIDN IN BIPDLAR TRANSISTDR MEMDRY CELLS
3805095 - FET THRESHOLD COMPENSATING BIAS CIRCUIT
3808462 - INVERTER INCDRPDRATING CDMPLEMENTARY FIELD EFFECT TRANSISTDRS
3812388 - SYNCHRONIZED STATIC MOSFET LATCH
3813558 - OIRECTIONAL, NDN-VDLATILE BISTABLE RESISTOR LDGIC CIRCUITS
3816758 - DIGITAL LOGIC CIRCUIT
3821781 - COMPLEMENTARY FIELD EFFECT TRANSISTORS HAVING P DDPED SILICON GATES
3823353 - MULTI LAYERED VERTICAL TRANSISTOR HAVING REACH-THRDUGH ISDLATING CONTACTS
3825772 - CONTACT BOUNCE ELIMINATOR CIRCUIT WITH LOW STANDBY PDWER
3832574 - FAST INSULATED GATE FIELD EFFECT TRANSISTOR CIRCUIT USING MULTIPLE THRESHDLD TECHNDLOGY
3832575 - OATA BUS TRANSMISSIDN LINE TERMINATIDN CIRCUIT
3836789 - TRANSISTOR-TRANSISTOR LOGIC CIRCUITRY AND BIAS CIRCUIT
3843895 - TWD-WAY OR CIRCUIT USING JOSEPHSON TUNNELLING TECHNDLOGY
3843954 - HIGH-VDLTAGE INTEGRATED ORIVER CIRCUIT AND MEMDRY EMBDDYING SAME
3846643 - OELAYLESS TRANSISTDR LATCH CIRCUIT
3848259 - MULTICONTROL LOGIC GATE OESIGN
3866176 - ADDRESS SELECTIDN CIRCUIT FDR STORAGE ARRAYS
3868515 - JDSEPHSDN DEVICE THRESHDLD GATES
3875426 - LDGICALLY CONTRDLLED INVERTER
3882325 - MULTI-CHIP LATCHING CIRCUIT FDR AVDIOING INPUT-DUTPUT PIN LIMITATIONS
3883802 - PRDCESS FDR STRESS TESTING FET GATES WITHOUT THE USE DF TEST PATTERNS
3891864 - JDSEPHSDN JUNCTION LOGIC ELEMENT
3896482 - OYNAMIC MDSFET LAYDUT TECHNIQUE
3900746 - VDLTAGE LEVEL CDNVERSION CIRCUIT
3904889 - SUPERCDNDUCTIVE LOGIC CIRCUIT UTILIZING JOSEPHSON TUNNELLING DEVICES
3906254 - COMPLEMENTARY FET PULSE LEVEL CDNVERTER
3909634 - THREE STATE LATCH
3909637 - CROSS-CDUPLED CAPACITOR FDR AC PERFDRMANCE TUNING
3909808 - MINIMUM PITCH MDSFET OECDDER CIRCUIT CDNFIGURATION
3911428 - OECODE CIRCUIT
3916218 - INTEGRATED PDWER SUPPLY FDR MERGED TRANSISTOR LDGIC CIRCUIT
3922565 - MDNDLITHICALLY INTEGRABLE OIGITAL BASIC CIRCUIT
3924144 - METHDD FDR TESTING LOGIC CHIPS AND LOGIC CHIPS AOAPTEO THEREFOR
3940596 - DYNAMIC LOGIC CDUNTER
3953749 - BINARY CIRCUITRY INCLUDING SWITCHING ELEMENTS UTILIZING SUPERCONDUCTIVE TUNNELING EFFECTS

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

INTERNATIONAL BUSINESS MACHINES CORPORATION (CONTINUED)

3956641 - COMPLEMENTARY TRANSISTOR CIRCUIT FOR CARRYING OUT BOOLEAN FUNCTIONS
3970875 - LSI CHIP COMPENSATOR FOR PROCESS PARAMETER VARIATIONS
3975623 - LOGIC ARRAY WITH MULTIPLE READOUT TABLES
3983543 - RANDOM ACCESS MEMORY READ/WRITE BUFFER CIRCUITS INCORPORATING COMPLEMENTARY FIELD EFFECT TRANSISTORS
3986041 - CMOS DIGITAL CIRCUITS WITH RESISTIVE SHUNT FEEDBACK AMPLIFIER
3986043 - CMOS DIGITAL CIRCUITS WITH ACTIVE SHUNT FEEDBACK AMPLIFIER
3986047 - RAMP RELEASE AND RESET CIRCUIT FOR A THREE PHASE VOLTAGE REGULATOR
3986054 - HIGH VOLTAGE INTEGRATED DRIVER CIRCUIT
3986057 - HIGH PERFORMANCE LATCH CIRCUIT
3986126 - SERIAL PULSE-CODE-MODULATED RETIMING SYSTEM
3987286 - TIME SPLIT ARRAY LOGIC ELEMENT AND METHOD OF OPERATION
3987287 - HIGH DENSITY LOGIC ARRAY
3987309 - SUPERCONDUCTIVE SENSING CIRCUIT FOR PROVIDING IMPROVED SIGNAL-TO-NOISE
3987410 - ARRAY LOGIC FABRICATION FOR USE IN PATTERN RECOGNITION EQUIPMENTS AND THE LIKE
3988617 - FIELD EFFECT TRANSISTOR BIAS CIRCUIT
3990045 - ARRAY LOGIC FABRICATION FOR USE IN PATTERN RECOGNITION EQUIPMENTS AND THE LIKE
3993919 - PROGRAMMABLE LATCH AND OTHER CIRCUITS FOR LOGIC ARRAYS
3993957 - CLOCK CONVERTER CIRCUIT
3995171 - DECODER DRIVER CIRCUIT FOR MONOLITHIC MEMORIES
3995172 - ENHANCEMENT-AND DEPLETION-TYPE FIELD EFFECT TRANSISTORS CONNECTED IN PARALLEL
3996481 - FET LOAD GATE COMPENSATOR
4001601 - TWO BIT PARTITIONING CIRCUIT FOR A DYNAMIC, PROGRAMMED LOGIC ARRAY
4006365 - EXCLUSIVE OR INTEGRATED LOGIC CIRCUITS USING COMPLEMENTARY MOSFET TECHNOLOGY
4009472 - DYNAMIC ASSOCIATIVE CELL
4012642 - JOSEPHSON JUNCTION LOGIC ELEMENT
4012646 - POWERING SCHEME FOR JOSEPHSON LOGIC CIRCUITS WHICH ELIMINATES DISTURB SIGNALS
4016431 - OPTIMAL DRIVER FOR LSI
4025799 - DECODER STRUCTURE FOR A FOLDED LOGIC ARRAY
4025909 - SIMPLIFIED DYNAMIC ASSOCIATIVE CELL
4029970 - CHANGEABLE DECODER STRUCTURE FOR A FOLDED LOGIC ARRAY
4029975 - LOW-CROSSTALK-AUTOMATIC RESETTING SCHEME FOR JOSEPHSON JUNCTION LOGIC CIRCUIT
4032894 - LOGIC ARRAY WITH ENHANCED FLEXIBILITY
4034243 - LOGIC ARRAY STRUCTURE FOR DEPLETION MODE-FET LOAD CIRCUIT TECHNOLOGIES
4034356 - RECONFIGURABLE LOGIC ARRAY
4035664 - CURRENT HOGGING INJECTION LOGIC
4039856 - DISTRIBUTED JOSEPHSON JUNCTION LOGIC CIRCUIT
4039867 - CURRENT SWITCH CIRCUIT HAVING AN ACTIVE LOAD
4051352 - LEVEL SENSITIVE EMBEDDED ARRAY LOGIC SYSTEM
4053792 - LOW POWER COMPLEMENTARY FIELD EFFECT TRANSISTOR (CFET) LOGIC CIRCUIT
4057787 - READ ONLY MEMORY
4069428 - TRANSISTOR-TRANSISTOR-LOGIC CIRCUIT
4071783 - ENHANCEMENT/DEPLETION MODE FIELD EFFECT TRANSISTOR DRIVER
4072868 - FET INVERTER WITH ISOLATED SUBSTRATE LOAD
4074150 - MOS INTERCHIP RECEIVER DIFFERENTIAL AMPLIFIERS EMPLOYING RESISTOR SHUNT CMOS AMPLIFIERS
4074151 - MOS INTERCHIP RECEIVER DIFFERENTIAL AMPLIFIERS EMPLOYING CMOS AMPLIFIERS HAVING PARALLEL CONNECTED CMOS TRANSISTORS AS F EEDBACK SHUNT IMPEDANCE PATHS
4084152 - TIME SHARED PROGRAMMABLE LOGIC ARRAY
4092548 - SUBSTRATE BIAS MODULATION TO IMPROVE MOSFET CIRCUIT PERFORMANCE
4092551 - A.C. POWERED SPEED UP CIRCUIT
4092553 - JOSEPHSON LOGIC CIRCUIT POWERING ARRANGEMENT
4097765 - ELECTRONICALLY ALTERABLE NON-LATCHING JOSEPHSON AND, OR, NAND, NOR LOGIC CIRCUIT
4107550 - BUCKET BRIGADE CIRCUITS
4107554 - DATA BUS ARRANGEMENT FOR JOSEPHSON TUNNELING DEVICE LOGIC INTERCONNECTIONS
4110633 - DEPLETION/ENHANCEMENT MODE FET LOGIC CIRCUIT
4112314 - LOGICAL CURRENT SWITCH

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

INTERNATIONAL BUSINESS MACHINES CDRPDRATION (CONTINUED)

4117354 - TWD-PART CURRENT INJECTIDN INTERFERDMETER AMPLIFIERS AND LDGIC CIRCUITS
4122361 - DELAY CIRCUIT WITH FIELD EFFECT TRANSISTORS
4123669 - LDGICAL OR CIRCUIT FOR PROGRAMMED LOGIC ARRAYS
4129790 - HIGH DENSITY INTEGRATED LOGIC CIRCUIT
4129793 - HIGH SPEED TRUE/CDMPLEMENT ORIVER
4130768 - LOW PDWER TRUE/COMPLEMENT ORIVER
4136290 - JOSEPHSDN SELF GATING AND CIRCUIT AND LATCH CIRCUIT
4140921 - GENERALIZED PERFORMANCE PDWER DPTIMIZED PLA CIRCUITS
4149097 - WAVEFDRM TRANSITION SENSITIVE JOSEPHSON JUNCTION CIRCUIT HAVING SENSE BUS AND LOGIC APPLICATIONS
4158783 - CURRENT HDGGING INJECTIDN LOGIC WITH SELF-ALIGNED DUTPUT TRANSISTDRS
4177452 - ELECTRICALLY PRDGRAMMABLE LOGIC ARRAY
4191899 - VOLTAGE VARIABLE INTEGRATEO CIRCUIT CAPACITOR AND BDDTSTRAP DRIVER CIRCUIT
4198577 - LOOP DECDDER FOR JDSEPHSON MEMDRY ARRAYS
4202044 - QUATERNARY FET READ ONLY MEMDRY
4204130 - MULTICDLLECTOR TRANSISTDR LDGIC CIRCUIT
4233667 - DEMAND PDWERED PRDGRAMMABLE LDGIC ARRAY
4245324 - COMPACT PRDGRAMMABLE LOGIC READ ARRAY HAVING MULTIPLE OUTPUTS
4251737 - DDTTABLE ACTIVE CDLLECTOR DRIVER CIRCUIT
4268908 - MDDULAR MACRDPROCESSING SYSTEM COMPRISING A MICRDPRDCESSDR AND AN EXTENDABLE NUMBER OF PRDGRAMMED LDGIC ARRAYS
4276487 - FET DRIVER CIRCUIT WITH SHDRT SWITCHING TIMES
4277701 - SEMICONDUCTOR INTEGRATEO INJECTION LOGIC STRUCTURE CDNTRDLLED BY THE INJECTOR
4280198 - METHDO AND CIRCUIT ARRANGEMENT FOR CONTRDLLING AN INTEGRATEO SEMICONDUCTOR MEMDRY
4283640 - ALL-NPN TRANSISTOR ORIVER AND LDGIC CIRCUIT
4286179 - PUSH PULL SWITCH UTILIZING TWD CURRENT SWITCH CIRCUITS
4287435 - COMPLEMENTARY TRANSISTOR INVERTING EMITTER FDLLOWER CIRCUIT
4289978 - CDMPLEMENTARY TRANSISTDR INVERTING EMITTER FOLLOWER CIRCUIT
4295064 - LDGIC AND ARRAY LOGIC ORIVING CIRCUITS
4301381 - TTL-CDMPATIBLE AODRESS LATCH WITH FIELD EFFECT TRANSISTORS
4306159 - BIPDLAR INVERTER AND NAND LDGIC CIRCUIT WITH EXTREMELY LOW DC STANDBY PDWER
4308469 - UNITY GAIN EMITTER FOLLOWER BRIDGE CIRCUIT
4311925 - CURRENT SWITCH EMITTER FDLLDWER LATCH HAVING OUTPUT SIGNALS WITH REOUCEO NDISE
4313066 - OIRECT COUPLED NDNLINEAR INJECTIDN JOSEPHSDN LOGIC CIRCUITS
4315167 - SELF-SWITCHING BIDIRECTIONAL DIGITAL LINE DRIVER
4319148 - HIGH SPEEO 3-WAY EXCLUSIVE DR LOGIC CIRCUIT
4328435 - DYNAMICALLY SWITCHABLE LOGIC BLOCK FOR JK/EOR FUNCTIONS
4334158 - SUPERCDNDUCTING SWITCH AND AMPLIFIER DEVICE

INTERNATIONAL STANDARD ELECTRIC CORPDRATIDN

3508077 - ARRANGEMENT FOR ELECTRONIC FEEDING-IN REPDRTING PULSES INDICATING THE CDNTACT POSITION DF SWITCHES IN TELECONTRDL SYSTEM S
3913023 - FAIL-SAFE LOGIC CIRCUIT ARRANGEMENT FOR USE IN RAILWAY SIGNALLING SYSTEMS
3947697 - SYNCHRDNIZING CIRCUIT INCLUDING TWD FLIP-FLOPS AND CIRCUIT MEANS TO PRDTECT A SYNCHRONIZEO SIGNAL FROM AN UNSTABLE STATE OF THE FLIP-FLOPS
4063113 - LOGIC TRANSFER CIRCUIT EMPLOYING MDS TRANSISTORS

INTERNATIONAL TELEPHDNE AND TELEGRAPH CORPORATION

3496539 - COMPARATOR USING RESISTOR-OIODE LOGIC
3538344 - SYNCHRDNIZED STARTING OF REDUNDANT OIGITAL OIVIDERS
3654492 - CODE COMMUNICATION FRAME SYNCHRDNIZATIDN SYSTEM
3662193 - TRI-STABLE CIRCUIT
3882329 - GATE GENERATOR WITH J-K FLIP-FLOPS
3916219 - BUCKET BRIGAOE CIRCUIT HAVING FREQUENCY OEPENDENT ATTENUATION COMPENSATION
4039960 - AUTOMATIC PHASING CIRCUIT TD TRANSFER OIGITAL OATA FROM AN EXTERNAL INTERFACE CIRCUIT TD AN INTERNAL INTERFACE CIRCUIT

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

INTERSIL, INC.
3829713 - CMOS DIGITAL OIVISION NETWORK

ITT INOUSTRIES, INC.
4092552 - BIPOLAR MONOLITHIC INTEGRATED PUSH-PULL POWER STAGE FOR DIGITAL SIGNALS
4216391 - CIRCUIT ARRANGEMENT FOR GENERATING A BINARY-CODED PULSE TRAIN
4302690 - CMOS CIRCUIT FOR CONVERTING A TERNARY SIGNAL INTO TWO BINARY SIGNALS, AND USE OF THIS CMOS CIRCUIT
4323794 - BIAS VOLTAGE GENERATOR FOR A MONOLITHIC INTEGRATED CIRCUIT
4331892 - MONOLITHIC INTEGRATEO CIRCUIT FOR A DIGITAL-TO-ANALOG CONVERTER

JEUMONT-SCHNEIOER
3872324 - LOGIC SYSTEM FOR SEQUENTIALLY TESTING THE STATES OF A SYSTEM OF CONTACTS

JOHNSON CONTROLS, INC.
3529176 - BINARY LOGIC CODEO CONTROL
3876951 - OIGITAL FILTER CIRCUITS

KABUSHIKI KAISHA OAINI SEIKOSHA
4045691 - LEVEL SHIFT CIRCUIT
4160176 - ELECTRONIC WATCH
4256984 - INTERLEVEL INTERFACE FOR SERIES POWERED IIL OR SITL

KABUSHIKI KAISHA SUWA SEIKOSHA
3760580 - BINARY OIVIOER CIRCUIT FOR ELECTRONIC WATCH
3828547 - QUARTZ CRYSTAL TIMEPIECE
3922568 - ORIVING CIRCUITS FOR ELECTRONIC WATCHES
3925978 - TIME CORRECTING ARRANGEMENT FOR ELECTRONIC WRIST WATCHES
4024676 - ELECTRONIC TIMEPIECE
4034303 - ELECTRONIC PULSE GENERATING CIRCUIT FOR ELIMINATING SPIKE PULSES
4112670 - ELECTRONIC TIMEPIECE
4168498 - DIGITAL OISPLAY DRIVE AND VOLTAGE OIVIDER CIRCUIT
4258310 - SELECTIVELY AOJUSTABLE VOLTAGE DETECTION INTEGRATED CIRCUIT

KIMBALL INTERNATIONAL, INC.
3992973 - PULSE GENERATOR FOR AN ELECTRONIC MUSICAL INSTRUMENT

KIMBALL PIANO + ORGAN CO.
3456546 - COINCIOENCE CIRCUIT ANO TEACHING MACHINE FOR KEY- BOARD OEVICES UTILIZING COINCIOENCE CIRCUIT AND METHOD OF OPERATION

KOGYO GIJUTSUIN
3681616 - LOGIC CIRCUITS

KOKUSAI OENSHIN OENWA KABUSHIKI KAISHA
3558905 - FAIL-SAFE LOGICAL SYSTEM
3585413 - OPTICAL LOGIC CIRCUIT
3600603 - TERNARY LOGIC CIRCUIT
4001611 - ASYNCHRONOUS DELAY CIRCUIT

LANOIS TOOL COMPANY
3673434 - NOISE IMMUNE FLIP-FLOP CIRCUIT ARRANGEMENT

LASALLE MACHINE TOOL, INC.
3684926 - ALTERNATING CURRENT STATIC CONTROL SYSTEM
3774235 - ALTERNATING CURRENT STATIC CONTROL SYSTEM

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

LEAR SIEGLER, INC.
3639778 - TESTING A SIGNAL VOTER
3670148 - SELECTIVE SIGNAL TRANSMISSION SYSTEM
3737675 - LATCHED GATING CIRCUIT

LICENTIA PATENT-VERWALTUNGS-GMBH
3654485 - A.C. SIGNAL LOGIC CIRCUIT
3740576 - DYNAMIC LDGIC INTERCONNECTION
3788904 - METHDD OF PRODUCING AN INTEGRATED SDLID STATE CIRCUIT

LITHIC SYSTEMS, INC.
3721834 - STORAGE ENERGY REGULATING CIRCUIT

LORAIN PRODUCTS CORPORATION
3619661 - MULTI-CHANNEL CONTROL CIRCUIT
3737674 - MAJORITY LOGIC SYSTEM
3770982 - MAJORITY LOGIC SYSTEM

LYKES BROS., INC.
3428824 - LOGIC CIRCUITS

MAGSAT CORPORATION
3755691 - KEYBOARD CLOCK WITH TIMING CIRCUITRY FOR CONTROLLING TRANSFER OF DATA BETWEEN KEYBOARD AND PROCESSING APPARATUS

MARTIN-MARIETTA CORPDRATION
3521172 - BINARY PHASE COMPARATOR
3524073 - REDUNDANT MAJORITY VOTER

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
3818243 - ERROR CORRECTION BY REDUNDANT PULSE POWERED CIRCUITS
4236121 - DSCILLATORS INCLUDING CHARGE-FLOW TRANSISTOR LDGIC ELEMENTS
4293783 - STORAGE/LOGIC ARRAY

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.
3631260 - LOGIC CIRCUIT
3646329 - ADAPTIVE LOGIC CIRCUIT
3911289 - MOS TYPE SEMICONDUCTOR IC DEVICE
4045791 - APPARATUS FOR DRIVING LIQUID CRYSTAL DISPLAY DEVICE WHEREIN THE SIGNAL APPLIED THERETO IS VARIED IN ACCORDANCE WITH THE TEMPERATURE OF THE DEVICE

MCDONNELL DOUGLAS CORPORATION
4038563 - SYMMETRICAL INPUT NOR/NAND GATE CIRCUIT

MELPAR, INC.
3441911 - INTEGRATED CIRCUIT STATISTICAL SWITCH

MESSERSCHMITT-BOLKOW-BLOHM GMBH
3613014 - CHECK CIRCUIT FOR RING COUNTER

MICROSYSTEMS INTERNATIONAL LIMITED
3694673 - FIELD EFFECT DEVICE AND CIRCUIT HAVING HIGH CURRENT DRIVING CAPABILITIES UTILIZING SUCH DEVICE
3739194 - STATIC BIPOLAR TO MOS INTERFACE CIRCUIT
3769525 - BI-DIRECTIONAL AMPLIFYING BUS-SWITCH
3824408 - DRIVER CIRCUIT

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

MITEL CORPORATION
4246502 - MEANS FOR COUPLING INCOMPATIBLE SIGNALS TO AN INTEGRATEO CIRCUIT ANO FOR OERIVING OPERATING SUPPLY THEREFROM

MITSUBISHI OENKI KABUSHIKI KAISHA
3862441 - MOS-FET TIMING CIRCUIT
4080577 - SEMICONOUCTOR INTEGRATEO CIRCUIT

MOHAWK OATA SCIENCES CORP.
3422359 - OISTRIBUTOR CIRCUIT
3427470 - MULTIPLE LEVEL LOGIC CIRCUITS
3586983 - PRINT HAMMER CONTROL SYSTEM
3601636 - SINGLE-SHOT OEVICE

MONOLITHIC MEMORIES, INC.
4124899 - PROGRAMMABLE ARRAY LOGIC CIRCUIT
4151609 - FIRST IN FIRST OUT (FIFO) MEMORY

MONSANTO COMPANY
3740652 - SIGNAL SELECTOR CIRCUIT
3755679 - CONSTANT PHOTON ENERGY SOURCE

MOS TECHNOLOGY, INC.
3855581 - SEMICONOUCTOR OEVICE ANO CIRCUITS
3941989 - REOUCING POWER CONSUMPTION IN CALCULATORS

MOSTEK CORPORATION
3761899 - OYNAMIC RANOOM ACCESS MEMORY WITH A SECONOARY SOURCE
3775693 - MOSFET LOGIC INVERTER FOR INTEGRATEO CIRCUITS
3898479 - LOW POWER, HIGH SPEEO, HIGH OUTPUT VOLTAGE FET OELAY-INVERTER STAGE
3902082 - OYNAMIC OATA INPUT LATCH ANO OECOOER
3935476 - COMBINATION OUTPUT/INPUT LOGIC FOR INTEGRATEO CIRCUIT
3969633 - SELF-BIASEO TRINARY INPUT CIRCUIT FOR MOSFET INTEGRATEO CIRCUIT
3969706 - OYNAMIC RANOOM ACCESS MEMORY MISFET INTEGRATEO CIRCUIT
4061933 - CLOCK GENERATOR ANO OELAY STAGE
4135102 - HIGH PERFORMANCE INVERTER CIRCUITS
4142176 - SERIES REAO ONLY MEMORY STRUCTURE
4281398 - BLOCK REOUNOANCY FOR MEMORY ARRAY
4289973 - ANO-GATE CLOCK
4316106 - OYNAMIC RATIOLESS CIRCUITRY FOR RANOOM LOGIC APPLICATIONS

MOTOROLA INC.
3437831 - LOGIC CIRCUIT
3439186 - OIOOE TRANSISTOR LOGIC CIRCUIT HAVING IMPROVEO TURN-ON ORIVE
3445680 - LOGIC GATE HAVING A VARIABLE SWITCHING THRESHOLO
3446989 - MULTIPLE LEVEL LOGIC CIRCUITRY
3467839 - J-K FLIP-FLOP
3491251 - LOGIC CIRCUIT HAVING NOISE IMMUNITY CAPABILITY WHICH EXCEEOS ONE-HALF THE LOGIC SWING IN BOTH OIRECTIONS
3519810 - LOGIC ELEMENT (FULL AOOER) USING TRANSISTOR TREE-LIKE CONFIGURATION
3541353 - MOSFET OIGITAL GATE
3553601 - TRANSISTOR ORIVER CIRCUIT
3555294 - TRANSISTOR-TRANSISTOR LOGIC CIRCUITS HAVING IMPROVEO VOLTAGE TRANSFER CHARACTERISTIC
3594736 - MOS REAO-WRITE SYSTEM
3668425 - COMPLEMENTARY METAL OXIOE SEMICONOUCTOR EXCLUSIVE OR GATE
3676700 - INTERFACE CIRCUIT FOR COUPLING BIPOLAR TO FIELO EFFECT TRANSISTORS
3683202 - COMPLEMENTARY METAL OXIOE SEMICONOUCTOR EXCLUSIVE NOR GATE
3700915 - FULL-POWER/HALF-POWER LOGIC GATE

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

MOTOROLA INC. (CONTINUED)

3706043 - SYNCHRONOUS PARALLEL COUNTER WITH COMMON STEERING OF CLOCK PULSES TO BINARY STAGES
3708689 - VOLTAGE LEVEL TRANSLATING CIRCUIT
3728530 - BINARY TO DECIMAL CONVERTER CIRCUIT
3753009 - RESETTABLE BINARY FLIP-FLOP OF THE SEMICONDUCTOR TYPE
3760380 - SILICON GATE COMPLEMENTARY MOS DYNAMIC RAM
3796893 - PERIPHERAL CIRCUITRY FOR DYNAMIC MOS RAMS
3806371 - METHOD OF MAKING COMPLEMENTARY MONOLITHIC INSULATED GATE FIELD EFFECT TRANSISTORS HAVING LOW THRESHOLD VOLTAGE AND LOW L EAKAGE CURRENT
3835457 - DYNAMIC MOS TTL COMPATIBLE
3845325 - IGFET FLIP-FLOP HAVING FACILITY FOR FORCING ITS STATE
3898477 - SELF RATIOING INPUT BUFFER CIRCUIT
3902128 - FREQUENCY/PHASE COMPARATOR
3906255 - MOS CURRENT LIMITING OUTPUT CIRCUIT
3909633 - WIDE BANDWIDTH SOLID STATE INPUT BUFFER
3912947 - MOS DATA BUS CONTROL CIRCUITRY
3914620 - DECODE CIRCUITRY FOR BIPOLAR RANDOM ACCESS MEMORY
3917961 - CURRENT SWITCH EMITTER FOLLOWER MASTER-SLAVE FLIP-FLOP
3922647 - EXTERNAL EXCLUSIVE OR TYPE CIRCUIT FOR INVERTING CELL MOS RAM
3930169 - CMOS ODD MULTIPLE REPETITION RATE DIVIDER CIRCUIT
3942033 - CURRENT MODE LOGIC CIRCUIT
3942162 - PRE-CONDITIONING CIRCUITS FOR MOS INTEGRATED CIRCUITS
3943378 - CMOS SYNCHRONOUS BINARY COUNTER
3946246 - FULLY COMPENSATED EMITTER COUPLED LOGIC GATE
3965460 - MOS SPEED-UP CIRCUIT
3974404 - INTEGRATED CIRCUIT INTERFACE STAGE FOR HIGH NOISE ENVIRONMENT
3976892 - PRE-CONDITIONING CIRCUITS FOR MOS INTEGRATED CIRCUITS
3976949 - EDGE SENSITIVE SET-RESET FLIP FLOP
3978347 - HIGH BAND WIDTH EMITTER COUPLED LOGIC GATE
3986044 - CLOCKED IGFET VOLTAGE LEVEL SUSTAINING CIRCUIT
3987310 - SCHOTTKY DIODE - COMPLEMENTARY TRANSISTOR LOGIC
4011549 - SELECT LINE HOLD DOWN CIRCUIT FOR MOS MEMORY DECODER
4019068 - LOW POWER OUTPUT DISABLE CIRCUIT FOR RANDOM ACCESS MEMORY
4023149 - STATIC STORAGE TECHNIQUE FOR FOUR TRANSISTOR IGFET MEMORY CELL
4027285 - DECODE CIRCUITRY FOR BIPOLAR RANDOM ACCESS MEMORY
4031477 - SYSTEM FOR TRANSFERRING FOUR COMMANDS OVER A SINGLE CONDUCTOR UTILIZING DUAL THRESHOLD LOGIC GATES
4042834 - FREQUENCY DOUBLER CIRCUIT
4048629 - LOW POWER MOS RAM ADDRESS DECODE CIRCUIT
4053923 - INTEGRATED LOGIC ELEMENTS WITH IMPROVED SPEED-POWER CHARACTERISTICS
4065736 - AMPLITUDE AND PHASE PROGRAMMABLE ACOUSTIC SURFACE WAVE MATCHED FILTER
4075508 - I\2/ L INJECTOR CURRENT SOURCE
4081695 - BASE DRIVE BOOST CIRCUIT FOR IMPROVED FALL TIME IN BIPOLAR TRANSISTOR LOGIC CIRCUITS
4085341 - INTEGRATED INJECTION LOGIC CIRCUIT HAVING REDUCED DELAY
4097772 - MOS SWITCH WITH HYSTERESIS
4099263 - BUFFERING FOR AN I\2/ L MEMORY CELL
4100431 - INTEGRATED INJECTION LOGIC TO LINEAR HIGH IMPEDANCE CURRENT INTERFACE
4132906 - CIRCUIT TO IMPROVE RISE TIME AND/OR REDUCE PARASITIC POWER SUPPLY SPIKE CURRENT IN BIPOLAR TRANSISTOR LOGIC CIRCUITS
4146802 - SELF LATCHING BUFFER
4150308 - CMOS LEVEL SHIFTER
4158782 - I+HU 2+B L INTERFACE WITH EXTERNAL INPUTS AND METHOD THEREOF
4161662 - STANDARDIZED DIGITAL LOGIC CHIP
4167727 - LOGIC CIRCUITS INCORPORATING A DUAL FUNCTION INPUT
4176287 - VERSATILE CMOS DECODER
4178584 - INTEGRATED INJECTION LOGIC DIGITAL-TO-ANALOG CONVERTER EMPLOYING FEEDBACK REGULATION AND METHOD
4191898 - HIGH VOLTAGE CMOS CIRCUIT
4194130 - DIGITAL PREDECODING SYSTEM

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

MOTOROLA INC. (CONTINUED)

4200917 - QUIET COLUMN DECODER
4216389 - BUS DRIVER/LATCH WITH SECOND STAGE STACK INPUT
4242605 - TRANSIENT ARRAY DRIVE FOR BIPOLAR ROM/PROM
4250406 - SINGLE CLOCK CMOS LOGIC CIRCUIT WITH SELECTED THRESHOLD VOLTAGES
4274018 - SATURATION LIMITED BIAS CIRCUIT FOR COMPLEMENTARY TRANSISTORS
4289982 - APPARATUS FOR PROGRAMMING A DYNAMIC EPROM
4291242 - DRIVER CIRCUIT FOR USE IN AN OUTPUT BUFFER
4291246 - DIFFERENTIAL CAPACITIVE BUFFER
4292547 - IGFET DECODE CIRCUIT USING SERIES-COUPLED TRANSISTORS
4297593 - GLITCH ELIMINATOR CIRCUIT FOR TTL TRANSPARENT LATCH
4308526 - BINARY TO ONE OF N DECODER HAVING A TRUE AND A COMPLEMENT OUTPUT
4317053 - HIGH SPEED SYNCHRONIZATION CIRCUIT
4318013 - HIGH VOLTAGE DETECTION CIRCUIT
4318014 - SELECTIVE PRECHARGE CIRCUIT FOR READ-ONLY-MEMORY
4326135 - DIFFERENTIAL TO SINGLE-ENDED CONVERTER UTILIZING INVERTED TRANSISTORS
4333020 - MOS LATCH CIRCUIT

NAIGAI INDUSTRIES, INC.
3890512 - LOGIC CIRCUIT EQUIVALENT TO A RELAY CONTACT CIRCUIT

NATIONAL RESEARCH DEVELOPMENT CORPORATION
3594618 - ELECTRONIC LOGIC ELEMENT
4027175 - THRESHOLD LOGIC GATES
4157480 - INVERTERS AND LOGIC GATES EMPLOYING INVERTERS
4158147 - UNIDIRECTIONAL SIGNAL PATHS

NATIONAL SEMICONDUCTOR CORPORATION
3575609 - TWO PHASE ULTRA-FAST MICROPOWER DYNAMIC SHIFT REGISTER
3769530 - MULTIPLE EMITTER TRANSISTOR APPARATUS
3774055 - CLOCKED BOOTSTRAP INVERTER CIRCUIT
3790817 - SCHOTTKY CLAMPED TTL CIRCUIT
3792292 - THREE-STATE LOGIC CIRCUIT
3838296 - EMITTER COUPLED LOGIC TRANSISTOR CIRCUIT
3912948 - MOS BOOTSTRAP INVERTER CIRCUIT
3962589 - INVERTER WITH MINIMUM SKEW
3980898 - SENSE AMPLIFIER WITH TRI-STATE BUS LINE CAPABILITIES
3984703 - CMOS SCHMITT TRIGGER
4042915 - MOS DYNAMIC RANDOM ACCESS MEMORY HAVING AN IMPROVED ADDRESS DECODER CIRCUIT
4045689 - CIRCUIT FOR SQUARING THE TRANSFER CHARACTERISTICS OF A TTL GATE
4049979 - MULTI-BOOTSTRAP DRIVER CIRCUIT
4063117 - CIRCUIT FOR INCREASING THE OUTPUT CURRENT IN MOS TRANSISTORS
4096398 - MOS OUTPUT BUFFER CIRCUIT WITH FEEDBACK
4125869 - INTERCONNECT LOGIC
4128775 - VOLTAGE TRANSLATOR FOR INTERFACING TTL AND CMOS CIRCUITS
4194131 - TRISTATE LOGIC BUFFER CIRCUIT WITH ENHANCED DYNAMIC RESPONSE
4194132 - TRISTATE LOGIC BUFFER CIRCUIT WITH REDUCED POWER CONSUMPTION
4233524 - MULTI-FUNCTION LOGIC CIRCUIT
4242604 - MOS INPUT CIRCUIT WITH SELECTABLE STABILIZED TRIP VOLTAGE
4253033 - WIDE BANDWIDTH CMOS CLASS A AMPLIFIER
4258272 - TTL TO CMOS INPUT BUFFER CIRCUIT

NCR CORPORATION
3482111 - HIGH SPEED LOGICAL CIRCUIT
3497715 - THREE-PHASE METAL-OXIDE-SEMICONDUCTOR LOGIC CIRCUIT
3514641 - HOLDOVER CIRCUIT

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

NCR CORPORATION (CONTINUED)
- 3551692 - INSULATED-GATE FIELD-EFFECT TRANSISTOR COUPLING CIRCUITS
- 3733471 - RECIRCULATING COUNTER
- 4072869 - HAZARD-FREE CLOCKED MASTER/SLAVE FLIP-FLOP
- 4093878 - OE-GLITCHABLENON-METASTABLE FLIP-FLOP CIRCUIT
- 4160290 - ONE-BIT MULTIFUNCTION ARITHMETIC AND LOGIC CIRCUIT
- 4183095 - HIGH DENSITY MEMORY DEVICE
- 4266145 - TIME DEPENDENT MASTER RESET

NIPPONDENSO CO., LTD.
- 3686583 - SIGNAL GENERATOR FOR A FLASHER TYPE DIRECTIONAL INDICATOR
- 3860830 - INTERFACE CIRCUIT
- 3953748 - INTERFACE CIRCUIT
- 3980896 - INTEGRATED CIRCUIT DEVICE

NIPPON ELECTRIC CO., LTD.
- 3471712 - LOGICAL CIRCUIT COMPRISING FIELD-EFFECT TRANSISTORS
- 3502901 - DIGITAL CIRCUIT HAVING INDUCTIVE COUPLING AND TUNNEL DIODE
- 3571729 - PREDICTIVE GATE CIRCUIT FOR THE RECEPTION OF A PULSE-POSITION-MODULATED PULSE TRAIN
- 3575610 - SCANNING PULSE GENERATOR
- 3577018 - HIGH-SPEED LOGIC DEVICE EMPLOYING A GUNN-EFFECT ELEMENT AND A SEMICONDUCTOR LASER ELEMENT
- 3602734 - SEMICONDUCTOR DEVICE EMPLOYING GUNN EFFECT ELEMENTS
- 3639813 - COMPLEMENTARY ENHANCEMENT AND DEPLETION MOSFETS WITH COMMON GATE AND CHANNEL REGION, THE DEPLETION MOSFET ALSO BEING A J FET
- 3651348 - SEMICONDUCTOR LOGIC DEVICE EMPLOYING THE GUNN EFFECT ELEMENT
- 3668424 - INVERTER CIRCUIT
- 3731161 - SEMICONDUCTOR INTEGRATED CIRCUIT
- 3869622 - LOGIC GATE CIRCUIT INCLUDING A SCHOTTKY BARRIER DIODE
- 3869644 - PULSES OF THE SAME OR AN OPPOSITE POLARITY TO ELECTRODES OF A PLASMA DISPLAY PANEL
- 3872321 - INVERTER CIRCUIT EMPLOYING FIELD EFFECT TRANSISTORS
- 3909627 - TWO-PHASE DYNAMIC LOGIC CIRCUIT
- 3937982 - GATE CIRCUIT
- 3962686 - MEMORY CIRCUIT
- 3999081 - CLOCK-CONTROLLED GATE CIRCUIT
- 4051388 - FLIP-FLOP ACCOMPANIED BY TWO CURRENT SWITCHES, ONE HAVING A SMALLER CURRENT SINK CAPABILITY THAN THE OTHER
- 4090096 - TIMING SIGNAL GENERATOR CIRCUIT
- 4237388 - INVERTER CIRCUIT
- 4267463 - DIGITAL INTEGRATED CIRCUIT
- 4296339 - LOGIC CIRCUIT COMPRISING CIRCUITS FOR PRODUCING A FASTER AND A SLOWER INVERTED SIGNAL
- 4337525 - ASYNCHRONOUS CIRCUIT RESPONSIVE TO CHANGES IN LOGIC LEVEL

NIPPON GAKKI SEIZO KABUSHIKI KAISHA
- 4150392 - SEMICONDUCTOR INTEGRATED FLIP-FLOP CIRCUIT DEVICE INCLUDING MERGED BIPOLAR AND FIELD EFFECT TRANSISTORS
- 4234803 - INTEGRATED LOGIC CIRCUIT ARRANGEMENT
- 4255671 - IIL TYPE SEMICONDUCTOR INTEGRATED CIRCUIT

NIPPON KOGAKU K.K.
- 3703649 - TIMER FOR A CAMERA

NIPPON STEEL CORPORATION
- 4061975 - RECEIVER FOR PULSES OF DIFFERENT WIDTHS

NIPPON TELEGRAPH AND TELEPHONE PUBLIC CORPORATION
- 3510685 - HIGH SPEED SEMICONDUCTOR SWITCHING CIRCUITRY
- 3544808 - HIGH SPEED SATURATION MODE SWITCHING CIRCUIT FOR A CAPACITIVE LOAD
- 3648064 - MULTIPLE SIGNAL LEVEL HIGH SPEED LOGIC CIRCUIT DEVICE

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

NIPPON TELEGRAPH AND TELEPHONE PUBLIC CORPORATION (CONTINUED)
3787737 - HIGH SPEED/LOGIC CIRCUIT
4176290 - SUPERCONDUCTIVE JOSEPHSON CIRCUIT DEVICE
4207556 - PROGRAMMABLE LOGIC ARRAY ARRANGEMENT
4228525 - SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

NORTEC ELECTRONICS CORPORATION
3795827 - CONTROLLED SQUAREWAVE VOLTAGE GENERATING ELECTRONIC CIRCUIT

NORTH AMERICAN PHILIPS CORPORATION
3433978 - LOW OUTPUT IMPEDANCE MAJORITY LOGIC INVERTING CIRCUIT

NORTHERN TELECOM LIMITED
3515899 - LOGIC GATE WITH STORED CHARGE CARRIER LEAKAGE PATH
3522454 - PULSE CONTROL CIRCUIT

NORTHWESTERN UNIVERSITY
3579119 - UNIVERSAL LOGIC CIRCUITRY HAVING MODULES WITH MINIMUM INPUT-OUTPUT CONNECTIONS AND MINIMUM LOGIC GATES

ODETICS, INC.
3865981 - CLOCK SIGNAL ASSURANCE IN DIGITAL DATA COMMUNICATION SYSTEMS

OHKURA ELECTRIC CO., LTD.
4121118 - BIPOLAR SIGNAL GENERATING APPARATUS

OKI ELECTRIC INDUSTRY CO., LTD.
4107547 - LOGIC CIRCUIT FOR A SEMICONDUCTOR INTEGRATED CIRCUIT

OLYMPUS OPTICAL CO., LTD.
3560862 - SYSTEM FOR DETECTING THE MALFUNCTION IN A DETECTING DEVICE OF A DISPLACEMENT

OMRON TATEISI ELECTRONICS CO.
3609391 - TIMING PULSE GENERATOR
4040721 - DRIVER CIRCUIT FOR LIQUID CRYSTAL DISPLAY

PICKER CORPORATION
3683284 - PULSE HEIGHT ANALYZER

PLESSEY COMPANY LIMITED
3579272 - LOGIC CIRCUITS

PLESSEY HANDEL UND INVESTMENTS AG
3961351 - IMPROVEMENT IN OR RELATING TO INTEGRATED CIRCUIT ARRANGEMENTS
4056736 - INJECTION LOGIC ARRANGEMENTS
4129794 - ELECTRICAL INTEGRATED CIRCUIT CHIPS

PRECISION MONOLITHICS, INC.
4055773 - MULTISTAGE ELECTRICAL LADDER FOR DECREMENTING A SIGNAL INTO A PLURALITY OF WEIGHTED SIGNALS

P. R. MALLORY + CO., INC.
3450995 - SYSTEM USING LOGIC CIRCUITRY FOR CONTROLLING OPERATION IN PREDETERMINED SEQUENCE
3619645 - FREQUENCY DIVIDER
3922672 - AUDIBLE ALARM DEVICE

R. ALKAN CIE
3808459 - ELECTRONIC DISTRIBUTOR FOR THE SEQUENTIAL SUPPLYING ELECTRIC-CURRENT-RECEIVING LOADS

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

RAYTHEON COMPANY
- 3914628 - T-T-L ORIVER CIRCUITRY
- 3974403 - OIGITAL OATA TRANSMISSION SYSTEM
- 4174541 - BIPOLAR MONOLITHIC INTEGRATEO CIRCUIT MEMORY WITH STANDBY POWER ENABLE
- 4177390 - A FIELO EFFECT TRANSISTOR LOGIC GATE HAVING OEPLETION MOOE AND ENHANCEMENT MOOE TRANSISTORS

RCA CORPORATION
- 3430071 - LOGIC CIRCUIT
- 3434058 - RING COUNTERS EMPLOYING THRESHOLO GATES
- 3439185 - LOGIC CIRCUITS EMPLOYING FIELO-EFFECT TRANSISTORS
- 3450897 - STEPPING SWITCH EMPLOYING CHAIN OF LOGIC GATES HAVING MEANS FOR LOCKING A GATE IN A GIVEN STATE
- 3456126 - THRESHOLO GATE LOGIC AND STORAGE CIRCUITS
- 3457434 - LOGIC CIRCUIT
- 3458734 - SHIFT REGISTERS EMPLOYING THRESHOLO GATES
- 3460043 - PRIORITY CIRCUITS
- 3487316 - THRESHOLO GATES ANO CIRCUITS
- 3493785 - BISTABLE CIRCUITS
- 3500062 - OIGITAL LOGIC APPARATUS
- 3501647 - EMITTER COUPLEO LOGIC BIASING CIRCUIT
- 3506845 - NETWORKS OF ELEMENTS FOR IMPLEMENTING THRESHOLO FUNCTIONS
- 3508033 - COUNTER CIRCUITS
- 3508076 - LOGIC CIRCUITRY
- 3509362 - SWITCHING CIRCUIT
- 3510681 - CURRENT STEERING NETWORKS PROVIOING THE EXCLUSIVE OR FUNCTION
- 3519941 - THRESHOLO GATE COUNTERS
- 3522443 - LIMITING NETWORK
- 3523194 - CURRENT MOOE CIRCUIT
- 3524077 - TRANSLATING INFORMATION WITH MULTI-PHASE CLOCK SIGNALS
- 3532897 - THRESHOLO GATE CIRCUITS
- 3532991 - SHIFT CIRCUITS INCLUOING THRESHOLD OR OTHER LOGIC GATES ANO HAVING MULTIPLE-PHASE SHIFT PULSES APPLIEO TO EACH STAGE
- 3539823 - LOGIC CIRCUIT
- 3549899 - INPUT ANO OUTPUT EMITTER-FOLLOWER CML CIRCUITRY
- 3549900 - CURRENT MOOE SWITCHING CIRCUIT
- 3551693 - CLOCK LOGIC CIRCUITS
- 3551900 - INFORMATION STORAGE ANO OECOOER SYSTEM
- 3562555 - MEMORY PROTECTING CIRCUIT
- 3573488 - ELECTRICAL SYSTEM ANO LSI STANOARO CELLS
- 3575608 - CIRCUIT FOR OETECTING A CHANGE IN VOLTAGE LEVEL IN EITHER SENSE
- 3577166 - C-MOS OYNAMIC BINARY COUNTER
- 3588545 - J-K' FLIP-FLOP USING OIRECT COUPLEO GATES
- 3591855 - COMPLEMENTARY FIELO-EFFECT TRANSISTOR BUFFER CIRCUIT
- 3599184 - STORAGE CIRCUIT
- 3636527 - STORAGE CIRCUIT
- 3641362 - LOGIC GATE
- 3641368 - LOGIC CIRCUIT WHICH TURNS ON AND OFF RAPIOLY
- 3651342 - APPARATUS FOR INCREASING THE SPEEO OF SERIES CONNECTEO TRANSISTORS
- 3659118 - OECOOER CIRCUIT EMPLOYING SWITCHES SUCH AS FIELO-EFFECT OEVICES
- 3671768 - HIGH SPEEO SET-RESET FLIP-FLOP
- 3671881 - RESETTABLE LOGIC GATE MULTIVIBRATOR
- 3675144 - TRANSMISSION GATE ANO BIASING CIRCUITS
- 3676705 - LOGIC CIRCUITS EMPLOYING SWITCHES SUCH AS FIELO-EFFECT OEVICES
- 3678292 - MULTI-FUNCTION LOGIC GATE CIRCUITS
- 3679911 - OECOOER CIRCUIT
- 3699355 - GATE CIRCUIT
- 3706889 - MULTIPLE-PHASE LOGIC CIRCUITS
- 3710140 - FLIP-FLOP ANO HOLO PHASE OETECTOR

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

RCA CORPORATION (CONTINUEO)
- 3715603 - THRESHOLO GATE CIRCUITS EMPLOYING FIELO-EFFECT TRANSISTORS
- 3716723 - OATA TRANSLATING CIRCUIT
- 3727072 - INPUT CIRCUIT FOR MULTIPLE EMITTER TRANSISTOR
- 3731114 - TWO PHASE LOGIC CIRCUIT
- 3742248 - FREQUENCY OIVIOER
- 3755693 - COUPLING CIRCUIT
- 3767906 - MULTIFUNCTION FULL AOOER
- 3784918 - STORAGE CIRCUITS
- 3795823 - SIGNAL OETECTION IN NOISY TRANSMISSION PATH
- 3816765 - OIGITAL INTERFACE CIRCUIT FOR RANOOM NOISE GENERATOR
- 3818242 - HIGH-SPEEO LOGIC CIRCUITS
- 3825770 - MULTI-FUNCTION LOGIC GATE
- 3835336 - PULSE WIOTH SENSING CIRCUIT
- 3845328 - TRI-STATE LOGIC CIRCUIT
- 3855549 - CIRCUIT, SUCH AS CMOS CRYSTAL OSCILLATOR, WITH REOUCEO POWER CONSUMPTION
- 3904888 - CIRCUITS EXHIBITING HYSTERESIS USING TRANSISTORS OF COMPLEMENTARY CONOUCTIVITY TYPE
- 3921010 - PEAK VOLTAGE OETECTOR CIRCUITS
- 3943551 - LSI ARRAY USING FIELO EFFECT TRANSISTORS OF OIFFERENT CONOUCTIVITY TYPE
- 3953743 - LOGIC CIRCUIT
- 3973139 - LOW POWER COUNTING CIRCUITS
- 3979611 - TRANSISTOR SWITCHING CIRCUIT
- 4017741 - OYNAMIC SHIFT REGISTER CELL
- 4029971 - TRI-STATE LOGIC CIRCUIT
- 4037114 - TRI-STATE LOGIC CIRCUIT
- 4039857 - OYNAMIC BIASING OF ISOLATION BOAT INCLUOING OIFFUSEO RESISTORS
- 4039858 - TRANSITION OETECTOR
- 4039862 - LEVEL SHIFT CIRCUIT
- 4042841 - SELECTIVELY POWEREO FLIP-FLOP
- 4051391 - CURRENT-OPERATEO CIRCUITS ANO STRUCTURES
- 4103183 - QUASI-STATIC INVERTER CIRCUIT
- 4119961 - CCO BINARY-TO-GRAY COOE GENERATOR
- 4133040 - MULTI-FUNCTION LOGIC GATE WITH ONE GATE OELAY
- 4145624 - FET-TELO COMBINATION WITH CAPACITIVELY COUPLEO OUTPUT ELECTROOE MEANS
- 4155076 - CCO GRAY-TO-BINARY COOE GENERATOR
- 4160919 - EXCLUSIVE-OR CIRCUIT
- 4166965 - THRESHOLO GATE
- 4189782 - MEMORY ORGANIZATION
- 4207476 - EXCLUSIVE OR CIRCUIT
- 4274014 - SWITCHEO CURRENT SOURCE FOR CURRENT LIMITING COMPLEMENTARY SYMMETRY INVERTER
- 4275316 - RESETTABLE BISTABLE CIRCUIT
- 4295065 - LEVEL SHIFT CIRCUIT
- 4314166 - FAST LEVEL SHIFT CIRCUITS
- 4318015 - LEVEL SHIFT CIRCUIT
- 4321491 - LEVEL SHIFT CIRCUIT

REGENTS OF UNIVERSITY OF CALIFORNIA
- 4336468 - SIMPLIFIEO COMBINATIONAL LOGIC CIRCUITS ANO METHOO OF OESIGNING SAME

RELEX CORPORATION
- 3634769 - SEQUENTIAL GATING CIRCUIT

RELIANCE ELECTRIC COMPANY
- 4321487 - COMMON MOOE REJECTION COUPLER

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

RESEARCH CORPORATION
3500061 - UNIVERSAL LOGIC OEVICES

ROBERT BOSCH GMBH
4024418 - INTEGRATEO CIRCUIT CMOS INVERTER STRUCTURE
4150305 - FREQUENCY OIVIOER CIRCUITS
4297599 - CIRCUIT ARRANGEMENT FOR OBTAINING AN INTERFERENCE-FREE TRIGGER SIGNAL ESPECIALLY FOR A FUEL APPORTIONMENT OEVICE IN AN I NTERNAL COMBUSTION ENGINE

ROCKWELL INTERNATIONAL CORPORATION
3484625 - SIGNAL RESPONSIVE OEVICE
3515901 - NAND/NOR CIRCUIT
3518451 - GATING SYSTEM FOR REOUCING THE EFFECTS OF NEGATIVE FEEOBACK NOISE IN MULTIPHASE GATING OEVICES
3526783 - MULTIPHASE GATE USABLE IN MULTIPLE PHASE GATING SYSTEMS
3567968 - GATING SYSTEM FOR REOUCING THE EFFECTS OF POSITIVE FEEDBACK NOISE IN MULTIPHASE GATING OEVICES
3573487 - HIGH SPEED MULTIPHASE GATE
3575613 - LOW POWER OUTPUT BUFFER CIRCUIT FOR MULTIPHASE SYSTEMS
3579275 - ISOLATION CIRCUIT FOR GATING OEVICE
3582909 - RATIOLESS MEMORY CIRCUIT USING CONDITIONALLY SWITCHED CAPACITOR
3601627 - MULTIPLE PHASE LOGIC GATES FOR SHIFT REGISTER STAGES
3601637 - MINOR CLOCK GENERATOR USING MAJOR CLOCK SIGNALS
3617767 - FIELO EFFECT TRANSISTOR LOGIC GATE WITH ISOLATION DEVICE FOR REDUCING POWER DISSIPATION
3619670 - ELIMINATION OF HIGH VALUEO "P" RESISTORS FROM MOS LSI CIRCUITS
3626210 - THREE-PHASE CLOCK SIGNAL GENERATOR USING TWO-PHASE CLOCK SIGNALS
3629618 - FIELO EFFECT TRANSISTOR SINGLE PHASE CLOCK SIGNAL GENERATOR
3631261 - COMPACT LAYOUT FOR MULTIPHASE SHIFT REGISTER
3631267 - BOOTSTRAP ORIVER WITH FEEOBACK CONTROL CIRCUIT
3641370 - MULTIPLE PHASE CLOCK SIGNAL GENERATOR USING FREQUENCY RELATEO AND PHASE SEPARATED SIGNALS
3646369 - MULTI-PHASE FIELO EFFECT TRANSISTOR OC ORIVER
3660684 - LOW VOLTAGE LEVEL OUTPUT DRIVER CIRCUIT
3665473 - ADDRESS OECOOE LOGIC FOR A SEMICONOUCTOR MEMORY
3678290 - RATIOLESS ANO NON-INVERTING LOGIC CIRCUIT USING FIELD EFFECT BOOSTING OEVICES
3678476 - READ-ONLY RANOOM ACCESS SERIAL MEMORY SYSTEMS
3699539 - BOOTSTRAPPEO INVERTER MEMORY CELL
3737788 - SLOPE RESPONSIVE SIGNAL IDENTIFICATION MEANS
3740660 - MULTIPLE PHASE CLOCK GENERATOR CIRCUIT WITH CONTROL CIRCUIT
3745370 - CHARGE CIRCUIT FOR FIELO EFFECT TRANSISTOR LOGIC GATE
3746882 - INPUT SYNCHRONIZER CIRCUIT
3774053 - CLAMPING ARRANGEMENT FOR REOUCING THE EFFECTS OF NOISE IN FIELO EFFECT TRANSISTOR LOGIC CIRCUITS
3806880 - MULTIPLEXING SYSTEM FOR AOORESS OECODE LOGIC
3894246 - CLOCK RECOVERING APPARATUS ANO METHOD
3898480 - MULTIPHASE LOGIC CIRCUIT
3959730 - OIGITAL HYSTERESIS CIRCUIT
3965459 - SELECTABLE EIGHT OR TWELVE OIGIT INTEGRATEO CIRCUIT CALCULATOR ANO CONDITIONAL GATE OUTPUT SIGNAL MODIFICATION CIRCUIT T HEREFOR
3982138 - HIGH SPEEO-LOW COST, CLOCK CONTROLLEO CMOS LOGIC IMPLEMENTATION
3986042 - CMOS BOOLEAN LOGIC MECHANIZATION
3990070 - STROBING SCHEME ANO KEYBOARO SENSING CIRCUIT FOR A ONE CHIP CALCULATOR
3992703 - MEMORY OUTPUT CIRCUIT
4035663 - TWO PHASE CLOCK SYNCHRONIZING METHOO AND APPARATUS
4042838 - MOS INVERTING POWER ORIVER CIRCUIT
4044270 - OYNAMIC LOGIC GATE
4056735 - ONE SHOT PULSE GENERATOR ANO LOGIC LEVEL CONVERTER CIRCUIT
4100430 - MULTI-PHASE ANO GATE
4185209 - CMOS BOOLEAN LOGIC CIRCUIT
4250408 - CLOCK PULSE AMPLIFIER ANO CLIPPER

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

ROCKWELL INTERNATIONAL CORPORATION (CONTINUEO)
- 4256974 - METAL OXIOE SEMICONOUCTOR (MOS) INPUT CIRCUIT WITH HYSTERESIS
- 4300064 - SCHOTTKY OIOOE FET LOGIC INTEGRATEO CIRCUIT

SANOERS ASSOCIATES INC.
- 3694665 - WIREO OR CIRCUIT

SANYO ELECTRIC CO., LTO.
- 4179628 - FLIP-FLOP HAVING RESET PREFERENTIAL FUNCTION

SEMI, INC.
- 3959782 - MOS CIRCUIT RECOVERY TIME

SESCOSEM-SOCIETE EUROPEENE OE SEMICONOUCTEURS ET OE MICROELE
- 3725791 - OIVIOER CIRCUITS

SHARP KABUSHIKI KAISHA
- 3995222 - SINUSOIOAL WAVEFORM GENERATOR
- 4000411 - MOS LOGIC CIRCUIT
- 4019178 - CMOS ORIVE SYSTEM FOR LIQUIO CRYSTAL OISPLAY UNITS
- 4259595 - CLOCKING SYSTEM FOR MOS TRANSISTOR LOGIC CIRCUIT
- 4309629 - MOS TRANSISTOR OECOOER CIRCUIT
- 4309701 - LSI OEVICE INCLUOING A LIQUIO CRYSTAL OISPLAY ORIVE

SHELL OIL COMPANY
- 3502908 - TRANSISTOR INVERTER CIRCUIT
- 3502909 - PULSEO SUBSTRATE TRANSISTOR INVERTER
- 3528065 - OOUBLE-RAIL RANOOM ACCESS MEMORY CIRCUIT FOR INTEGRATEO CIRCUIT OEVICES
- 3577005 - TRANSISTOR INVERTER CIRCUIT
- 3588537 - OIGITAL OIFFERENTIAL CIRCUIT MEANS
- 3609329 - THRESHOLO LOGIC FOR INTEGRATEO FULL AOOER ANO THE LIKE
- 3621292 - PULSEO SUBSTRATE TRANSISTOR INVERTER
- 3638046 - FET SHIFT REGISTER STAGE

SHINTRON COMPANY, INC.
- 3764919 - N-ARY OF FLIP-FLOP CELLS INTERCONNECTEO BY ROWS OF LOGIC GATES

SIEMENS AKTIENGESELLSCHAFT
- 3482112 - COINCIOENCE GATE CIRCUIT WITH LOW-OHMIC LOAO
- 3593031 - OUTPUT SWITCHING AMPLIFIER
- 3612911 - ASYNCHRONOUS RS SWEEP STAGE IN ECL TECHNIQUE
- 3629610 - ECL LOGIC CIRCUIT
- 3649844 - PARITY CIRCUIT IN ECL TECHNIQUE WITH SHORT TRANSIT TIME
- 3655998 - LOGICAL GATE SWITCHING CIRCUIT IN ECL-SWITCHING CIRCUIT TECHNIQUE
- 3660676 - CIRCUIT ARRANGEMENT FOR CONVERTING SIGNAL VOLTAGES
- 3681614 - ECL GATE SWITCHING NETWORK
- 3686512 - LOGIC CIRCUIT FOR PROVIOING A SHORT SIGNAL TRANSIT TIME AS AN INTEGRATEO ELEMENT
- 3689802 - APPARATUS FOR SUPERVISING THE FUNCTIONING OF AN ANALOG PLURAL-CHANNEL REGULATING SYSTEM
- 3728552 - CONTROL OEVICE FOR A SELECTIVE MATRIX OF A OATA MEMORY WITH SELECTIVE ACCESS
- 3731120 - OIGITAL COMPACT CONTROL MOOULE
- 3780316 - OATA OISTRIBUTION LINE ARRANGEMENT
- 3786277 - CIRCUIT ARRANGEMENT OF MOS TRANSISTORS OPERATING ACCOROING TO THE OYNAMIC PRINCIPLE FOR OECOOING THE AOORESSES FOR AN MOS MEMORY
- 3805090 - CIRCUIT FOR ATTENUATING SPURIOUS SIGNALS
- 3806736 - TEMPERATURE COMPENSATEO EMITTER COUPLEO-LOGIC CIRCUIT
- 3836859 - CONTROL CIRCUIT FOR PREVENTING THE RESPONSE OF A PROGRAMMEO CONTROLLER TO SIMULTANEOUSLY GENERATEO CONTROL SIGNALS

DRGANIZATIDNAL PATENTING (1/69- 6/82) - - ALPHA LISTING

SIEMENS AKTIENGESELLSCHAFT (CDNTINUED)

3860831 - LDGIC CIRCUIT, IN PARTICULAR A DECDDER, WITH REDUNDANT ELEMENTS
3902050 - SERIAL PRDGRAMMABLE CDMBINATIDNAL SWITCHING FUNCTIDN GENERATDR
3906212 - SERIES-CDUPLED EMITTER CDUPLED LDGIC (ECL) CIRCUIT HAVING A PLURALITY DF INDEPENDENTLY CDNTROLLABLE CURRENT PATHS IN A L DWER PLANE
3974366 - INTEGRATED, PRDGRAMMABLE LDGIC ARRANGEMENT
4035782 - CHARGE CDUPLED DEVICE CIRCUIT FDR USE WITH A SEMICDNDUCTDR STDRAGE UNIT DR A SEMICDNDUCTDR LDGICAL UNIT
4037089 - INTEGRATED PROGRAMMABLE LDGIC ARRAY
4041459 - INTEGRATED PRDGRAMMABLE LDGIC ARRANGEMENT
4048517 - LDGIC ELEMENT
4053793 - MDDULAR LDGIC CIRCUIT FDR PERFDRMING DIFFERENT LDGIC FUNCTIDNS
4063174 - CIRCUIT ARRANGEMENT FDR DIVERSITY DATA TRANSMISSIDN
4063273 - FUNDAMENTAL LDGIC CIRCUIT
4091359 - MDDULAR LDGIC CIRCUIT UTILIZING CHARGE-STDRAGE TRANSISTDRS
4099162 - DECDDER CIRCUIT
4104735 - ARRANGEMENT FDR ADDRESSING A MDS STDRE
4131806 - I.I.L. WITH INJECTDR BASE RESISTDR AND SCHDTTKY CLAMP
4134033 - FAST-SWITCHING DIGITAL DIFFERENTIAL AMPLIFIER SYSTEM FDR CCD ARRANGEMENTS
4140922 - AMPLIFIER STAGE FDR THE CURRENT SUPPLY DF I+HU 2+B L CIRCUITS
4143284 - ARRANGEMENT FDR SUPPLYING I+HU 2+B L CIRCUITS WITH DIFFERING CURRENTS
4145622 - DECDDER CIRCUIT ARRANGEMENT WITH MDS TRANSISTDRS
4190778 - A.C. SUPPLIED INTEGRATED SEMI-CDNDUCTDR LDGIC CIRCUIT
4276485 - MDNDLITHIC DIGITAL SEMICDNDUCTDR CIRCUIT CDMPRISING A PLURALITY DF BIPDLAR TRANSISTDRS
4293780 - DIGITAL INTEGRATED SEMICDNDUCTDR CIRCUIT

SIGNETICS CDRPDRATIDN

3581107 - DIGITAL LDGIC CLAMP FDR LIMITING PDWER CDNSUMPTIDN DF INTERFACE GATE
3602733 - THREE DUTPUT LEVEL LDGIC CIRCUIT
3668430 - HIGH SPEED LDGIC CIRCUIT WITH LDW EFFECTIVE MILLER CAPACITANCE
3697775 - THREE STATE DUTPUT LDGIC CIRCUIT WITH BISTABLE INPUTS
3742250 - ACTIVE REGIDN LDGIC CIRCUIT
3742368 - PULSE GENERATDR USING SCHDTTKY EFFECT TRANSISTDRS
3743856 - EXCLUSIVE-DR ECL LDGIC CIRCUIT
3751680 - DDUBLE-CLAMPED SCHDTTKY TRANSISTDR LDGIC GATE CIRCUIT
3838393 - THRESHDLD LDGIC GATE
3867644 - HIGH SPEED LDW PDWER SCHDTTKY INTEGRATED LDGIC GATE CIRCUIT WITH CURRENT BDDST
3947865 - CDLLECTDR-UP SEMICDNDUCTDR CIRCUIT STRUCTURE FDR BINARY LDGIC
3970865 - PSEUDO-COMPLEMENTARY DECDDE DRIVER
3989957 - CDUNT-DF-TEN SEMICDNDUCTDR STRUCTURE
4005315 - TRIPLE STATE TD BINARY CDNVERTER
4042840 - UNIVERSAL DIFFERENTIAL LINE DRIVER INTEGRATED CIRCUIT
4065680 - CDLLECTDR-UP LDGIC TRANSMISSIDN GATES
4081822 - THRESHDLD INTEGRATED INJECTIDN LDGIC
4140920 - MULTIVALUED INTEGRATED INJECTIDN LDGIC CIRCUITRY AND METHDD
4160988 - INTEGRATED INJECTIDN LDGIC (I-SQUARED L) WITH DDUBLE-DIFFUSED TYPE INJECTDR
4268763 - CDNDITIONING CIRCUIT FDR USE WITH I\2/ L AND ISL LDGIC ARRAYS EMBDDYING TWD PDWER SUPPLIES

SINGER CDMPANY

3567957 - THRESHDLD LDGIC CIRCUITS UTILIZING SERIES CDNNECTED TRANSISTDRS AND LEVEL SHIFTING DIDDES
3708695 - HIGH SPEED SWITCH WITH CDMPLEMENTARY DUTPUTS

SINGER-GENERAL PRECISIDN INC.

3693102 - DIGITAL OSCILLATDR HAVING A FAST RESPDNSE USING TWD DNE-SHDT MULTIVIBRATORS AND A PAIR DF NAND GATES

SDCIETE EURDPEENNE DE SEMICDNDUCTEURS ET DE

3715637 - LOGIC CIRCUITS EMPLOYING COMPLEMENTARY FIELD-EFFECT TRANSISTDRS IN WHICH THE GATE IS INSULATED FRDM THE SUBSTRATE

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

SOCIETE INDUSTRIELLE BULL-GENERAL ELECTRIC -
3421022 - SIGNALLING CIRCUIT ARRANGEMENT
3523252 - TRANSFER-STORAGE STAGES FDR SHIFT REGISTERS AND LIKE ARRANGEMENTS

SOLARTRON ELECTRONIC GROUP LIMITEO
4250407 - MULTI FUNCTION PATCH PIN CIRCUIT

SOLIO STATE SCIENTIFIC DEVICES CORPDRATION
3609569 - LOGIC SYSTEM

SOLIO STATE SCIENTIFIC, INC.
3980897 - LOGIC GATING SYSTEM AND METHDO
4104860 - HIGH SPEEO OYNAMIC FLIP-FLOP SYSTEM

SOLITRON DEVICES INC.
4032795 - INPUT BUFFER

SONY CORPORATION
3622798 - INTEGRATED LDGIC CIRCUIT

SPECTRAOYNE, INC.
3942117 - ALL SATURATED SWITCHING MOOE SOLID STATE RF AMPLIFIER

SPERRY CORPORATIDN
3441859 - GENERAL PURPOSE BDDLEAN FUNCTION GENERATOR UTILIZING OUAL-THRESHOLO LDGIC ELEMENTS
3458240 - FUNCTION GENERATDR FOR PRODUCING THE POSSIBLE BODLEAN FUNCTION OF 'N' INDEPENDENT VARIABLES
3474262 - N-STATE CDNTRDL CIRCUIT
3531662 - BATCH FABRICATION ARRANGEMENT FOR INTEGRATEO CIRCUITS
3573447 - LDGICAL MULTIPLY SCHEME FOR BINARY CDMPUTER
3631352 - MID-VALUE SIGNAL SELECTOR
3634658 - PARALLEL BIT COUNTER
3654486 - TRANSISTDR LOGIC CIRCUIT WITH UPSET FEEOBACK
3666968 - LDW LEVEL PULSE PDLARITY OETECTOR
3681615 - SPLIT OUTPUT FOR A LOGIC GATE
3719932 - BIT ORGANIZED INTEGRATED MNDS MEMDRY CIRCUIT WITH DYNAMIC DECODING AND STDRE-RESTORE CIRCUITRY
3725789 - TEMPERATURE CDNTRDLLED CLOCKING DF LDGIC CIRCUITS
3743864 - CIRCUIT FOR DETECTING CDINCIDENCE BETWEEN LOW ENERGY SHORT RISE SIGNALS
3761811 - RATE-OF-TURN INDICATOR
3818202 - BINARY BYPASSABLE ARITHMETIC LINEAR MDDULE
3836792 - FDUR STAGE STORAGE ENHANCEO LOGIC CIRCUIT
3898632 - SEMICDNDUCTOR BLOCK-ORIENTED READ/WRITE MEMDRY
3971001 - REPROGRAMMABLE REAO ONLY VARIABLE THRESHOLO TRANSISTOR MEMORY WITH ISOLATEO ADORESSING BUFFER
4011468 - LOW POWER CLDCK ORIVER
4112380 - CLOCK SEQUENCING APPARATUS HAVING MORE STATES THAN CLOCK PHASE OUTPUTS
4222009 - PHASE LOCK LODP PRECONDITIONING CIRCUIT
4236087 - PROGRAMMABLE BUS ORIVER ISOLATION

SPRAGUE ELECTRIC COMPANY
3610951 - OYNAMIC SHIFT REGISTER

SQUARE O COMPANY
3450903 - TRANSISTOR SWITCHING CIRCUIT
4065683 - CIRCUITRY FOR INOUSTRIAL LOGIC SYSTEMS

STANDARD MICROSYSTEMS CORPORATION
3755690 - M.O.S. INPUT CIRCUIT WITH T.T.L. CDMPATABILITY

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

STANFORD RESEARCH INSTITUTE
3446990 - CONTROLLABLE LOGIC CIRCUITS EMPLOYING FUNCTIONALLY INDENTICAL GATES

STROMBERG-CARLSON CORPORATION
4044312 - COMPARISON CIRCUIT FOR REMOVING POSSIBLY FALSE SIGNALS FROM A DIGITAL BIT STREAM

STROMBERG DATAGRAPHIX INC.
3573637 - TIMING SYSTEM WITH OUTPUT REPRESENTING PREDETERMINED AND CONSTANT PHASE OISPLACEMENT FROM VARIABLE FREQUENCY INPUT

STRUTHERS-DUNN INC.
3613029 - CRYSTAL-CONTROLLED CROSS-COUPLED NAND GATE SQUARE WAVE GENERATOR
3626203 - MECHANICAL SWITCH INTERFACE

SUPERIOR ELECTRIC COMPANY
3491302 - TWO CONDITION FAILURE MDNITORING SYSTEM
3723759 - INTERFACE CIRCUIT

SUSQUEHANNA CORPORATION
3532996 - SIGNAL PROCESSING SYSTEM

TOK ELECTRONICS CO., LTD.
4323844 - TEST SYSTEM FOR DETECTING A PERMANENT DEFECT AND A TEMPORARY DEFECT IN MAGNETIC RECORDING TAPE

TEKTRONIX INC.
3558916 - CIRCUIT RESPONSIVE TO INPUT SIGNALS OF A SELECTABLE DURATION
3725792 - JITTER-FREE TRIGGER CDNTROL CIRCUIT
4121120 - CLOCK DRIVEN VOLTAGE COMPARATOR EMPLOYING MASTER-SLAVE CONFIGURATION

TELEFONAKTIEBOLAGET LM ERICSSON
3584207 - ARRANGEMENT FOR CARRYING OUT ALTERNATIVELY ADDITION OR ONE OF A NUMBER OF LOGICAL FUNCTIONS BETWEEN THE CONTENTS IN A PO SITION OF TWD BINARY WORDS
3628158 - ARRANGEMENT AT PARALLELLY WORKING MACHINES

TELEFUNKEN PATENTVERWERTUNGSGESELLSCHAFT MBH
3502900 - SIGNAL CONTROL CIRCUIT
3504192 - EMITTER-COUPLEO LOGIC CIRCUIT
3515904 - ELECTRONIC CIRCUITS UTILIZING EMITTER-COUPLEO TRANSISTORS
3551827 - T-FLIPFLOP COMPOSED OF LOGIC CIRCUITS
3558914 - SIGNAL VOLTAGE CONTROL FOR LOGIC CIRCUIT
3614468 - LOGIC CIRCUIT
36213D6 - CONTROLLED GUNN EFFECT DEVICE

TELEPHONE MANUFACTURING COMPANY LIMITED
3543055 - FOUR PHASE LOGIC SYSTEMS

TELETYPE CORPORATION
3596108 - FET LOGIC GATE CIRCUITS
3618050 - READ-ONLY MEMORY ARRAYS IN WHICH A PORTION OF THE MEMORY AODRESSING CIRCUITRY IS INTEGRAL TO THE ARRAY
3631465 - FET BINARY TO ONE OUT OF N DECODER
3845324 - DUAL VOLTAGE FET INVERTER CIRCUIT WITH TWO LEVEL BIASING
3903431 - CLOCKED DYNAMIC INVERTER
3944848 - VOLTAGE SENSITIVE ISOLATION FOR STATIC LOGIC CIRCUIT
3946245 - FAST-ACTING FEEDFORWARO KICKER CIRCUIT FOR USE WITH TWO SERIALLY CONNECTED INVERTERS
4011465 - MOSFET OETECTING ANO SYNCHRONIZING CIRCUIT FOR ASYNCHRONOUS OIGITAL DATA
4034242 - LOGIC CIRCUITS AND ON-CHIP FOUR PHASE FET CLOCK GENERATOR MAOE THEREFROM
414D927 - NON-OVERLAPPING CLOCK GENERATOR

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

TELETYPE CORPORATION (CONTINUEO)
4207616 - LOGIC ARRAY HAVING IMPROVED SPEEO CHARACTERISTICS

TERAOYNE, INC.
3878405 - SWITCHING CIRCUITRY FOR LOGICAL TESTING OF NETWORK CONNECTIONS

TESLA, NAROONI PODNIK
4041384 - CIRCUIT SYSTEM FOR ADJUSTING THE INPUT OF A CONNECTED-UP LOGIC CIRCUIT

TEXAS INSTRUMENTS, INCORPORATEO
3437843 - GATE CIRCUIT WITH MEANS FOR INHIBITING OUTPUT SIGNALS
3473045 - COMPLEMENTARY J-K FLIP-FLOP USING TRANSISTOR LOGIC
3474263 - FLOATING LATCH
3506846 - LOGIC GATE CIRCUIT HAVING COMPLEMENTARY OUTPUT ORIVE
3518449 - INTEGRATED LOGIC NETWORK
3534236 - SEMICONOUCTOR INTEGRATED CIRCUIT STRUCTURE
3541543 - BINARY OECOOER
3560760 - NONSATURATED HIGH SPEEO ORIVE GATE
3566153 - PROGRAMMABLE SEQUENTIAL LOGIC
3591856 - J-K MASTER-SLAVE FLIP-FLOP
3601628 - PRECHARGE MOS-BIPOLAR OUTPUT BUFFER
3601630 - MOS CIRCUIT WITH BIPOLAR EMITTER-FOLLOWER OUTPUT
3609398 - HIGH SPEEO INTEGRATEO LOGIC CIRCUIT
3619642 - MULTIPHASE BINARY SHIFT REGISTER
3622812 - BIPOLAR-TO-MOS INTERFACE STAGE
3643232 - LARGE SCALE INTEGRATION OF ELECTRONIC SYSTEMS IN MICROMINIATURE FORM
3649843 - MOS BIPOLAR PUSH-PULL OUTPUT BUFFER
3706975 - HIGH SPEEO MOS RANOOM ACCESS MEMORY
3717868 - MOS MEMORY OECODE
3749936 - FAULT PROTECTEO OUTPUT BUFFER
3753006 - HIGH SPEED, LOW POWER, OYNAMIC SHIFT REGISTER WITH SYNCHRONOUS LOGIC GATES
3758761 - SELF-INTERCONNECTING/SELF-REPAIRABLE ELECTRONIC SYSTEMS ON A SLICE
3775696 - SYNCHRONOUS OIGITAL SYSTEM HAVING A MULTISPEED LOGIC CLOCK OSCILLATOR
3778782 - IGFET OYNAMIC AOORESS DECODE CIRCUIT
3832576 - ENCODER CIRCUIT FOR REOUCE PIN COUNT FOR OATA ENTRY INTO INSULATEO GATE FIELO EFFECT TRANSISTOR INTEGRATED CIRCUITS
3840753 - TAPE REAO AMPLIFIER ANO LOGIC CIRCUIT
3852800 - ONE TRANSISTOR OYNAMIC MEMORY CELL
3886726 - ELECTRONIC TIME KEEPING SYSTEM
3916169 - CALCULATOR SYSTEM HAVING A PRECHARGED VIRTUAL GROUND MEMORY
3934233 - REAO-ONLY-MEMORY FOR ELECTRONIC CALCULATOR
3938094 - COMPUTING SYSTEM BUS
3940747 - HIGH OENSITY, HIGH SPEED RANDOM ACCESS READ-WRITE MEMORY
3971060 - TTL COUPLING TRANSISTOR
3986178 - INTEGRATEO INJECTION LOGIC RANDOM ACCESS MEMORY
3999080 - TRANSISTOR COUPLEO LOGIC CIRCUIT
4002933 - FIVE GATE FLIP-FLOP
4013901 - STACKEO LOGIC OESIGN FOR I\2/ L WATCH
4021656 - OATA INPUT FOR ELECTRONIC CALCULATOR OR DIGITAL PROCESSOR CHIP
4021781 - VIRTUAL GROUNO REAO-ONLY-MEMORY FOR ELECTRONIC CALCULATOR OR OIGITAL PROCESSOR
4035662 - CAPACITIVE MEANS FOR CONTROLLING THRESHOLO VOLTAGES IN INSULATED GATE FIELD EFFECT TRANSISTOR CIRCUITS
4049974 - PRECHARGE ARITHMETIC LOGIC UNIT
4053794 - SEMICONDUCTOR LOGIC GATES
4077031 - HIGH SPEEO ADORESS BUFFER FOR SEMICONDUCTOR MEMORY
4132059 - STACKEO LOGIC OESIGN FOR I+HU 2+B L WATCH
4180749 - INPUT BUFFER FOR INTEGRATEO INJECTION LOGIC CIRCUITS
4190897 - BINARY COOED OECIMAL AOORESSEO REAO-ONLY-MEMORY

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

TEXAS INSTRUMENTS, INCORPORATED (CONTINUED)
- 4197471 - CIRCUIT FOR INTERFACING BETWEEN AN EXTERNAL SIGNAL AND CONTROL APPARATUS
- 4227185 - SINGLE CHIP INTEGRATED ANALOG-TO-DIGITAL CONVERTER CIRCUIT POWERED BY A SINGLE VOLTAGE POTENTIAL
- 4239990 - CLOCK VOLTAGE GENERATOR FOR SEMICONDUCTOR MEMORY WITH REDUCED POWER DISSIPATION
- 4239991 - CLOCK VOLTAGE GENERATOR FOR SEMICONDUCTOR MEMORY
- 4290121 - VARIABLE FUNCTION PROGRAMMED CALCULATOR

THOMSON-CSF
- 3969632 - LOGIC CIRCUITS-EMPLOYING JUNCTION-TYPE FIELD-EFFECT TRANSISTORS
- 4013896 - HIGH-SPEED LOGIC GATE WITH TWO COMPLEMENTARY TRANSISTORS AND SATURABLE RESISTORS
- 4027261 - SYNCHRONIZATION EXTRACTOR
- 4028556 - HIGH-SPEED, LOW CONSUMPTION INTEGRATED LOGIC CIRCUIT
- 4069493 - NOVEL INTEGRATED CIRCUIT AND METHOD OF MANUFACTURING SAME
- 4121116 - COMPONENT FOR LOGIC CIRCUITS AND LOGIC CIRCUITS EQUIPPED WITH THIS COMPONENT
- 4155014 - LOGIC ELEMENT HAVING LOW POWER CONSUMPTION
- 4255676 - SEMICONDUCTOR PHASE SHIFT DEVICE FOR A CHARGE TRANSFER FILTER
- 4288805 - INTEGRATED LOGIC GATE WITH NPN INVERTER, PNP CLAMP, COUPLING, SHOTTKY DIODES AND DIFFUSED CROSSUNDER
- 4320313 - GUNN-EFFECT DEVICE MODULATABLE BY CODED PULSES, AND A PARALLEL-SERIES DIGITAL CONVERTER USING SAID DEVICE

TIMEX CORPORATION
- 4283784 - MULTIPLE TIME ZONE, ALARM AND USER PROGRAMMABLE CUSTOM WATCH

TOKO, INC.
- 4027174 - DYNAMIC DECODER CIRCUIT

TOKYO SHIBAURA ELECTRIC CO., LTD.
- 3522446 - CURRENT SWITCHING LOGIC CIRCUIT
- 3602732 - EXCLUSIVE AND/OR CIRCUIT DEVICE
- 3603848 - COMPLEMENTARY FIELD-EFFECT TYPE SEMICONDUCTOR DEVICE
- 3646332 - BINARY ADDER AND/OR SUBTRACTOR USING EXCLUSIVE LOGIC
- 3720841 - LOGICAL CIRCUIT ARRANGEMENT
- 3737673 - LOGIC CIRCUIT USING COMPLEMENTARY TYPE INSULATED GATE FIELD EFFECT TRANSISTORS
- 3769523 - LOGIC CIRCUIT ARRANGEMENT USING INSULATED GATE FIELD EFFECT TRANSISTORS
- 3806714 - SEQUENCE CONTROLLER
- 3829710 - LOGIC CIRCUIT ARRANGEMENT USING INSULATED GATE FIELD EFFECT TRANSISTORS
- 3866186 - LOGIC CIRCUIT ARRANGEMENT EMPLOYING INSULATED GATE FIELD EFFECT TRANSISTORS
- 3887822 - FLIP-FLOP CIRCUITS UTILIZING INSULATED GATE FIELD EFFECT TRANSISTORS
- 3925685 - TIME SHARING INFORMATION CIRCUIT
- 3943377 - LOGIC CIRCUIT ARRANGEMENT EMPLOYING INSULATED GATE FIELD EFFECT TRANSISTORS
- 3945000 - SERIES LOGIC CIRCUIT ARRANGEMENT USING A PLURALITY OF COMPLEMENTARY IGFET'S
- 3947829 - LOGICAL CIRCUIT APPARATUS
- 3949242 - LOGICAL CIRCUIT FOR GENERATING AN OUTPUT HAVING THREE VOLTAGE LEVELS
- 3958187 - CLOCK SIGNAL GENERATING DEVICE WITH COMPLEMENTARY MOS TRANSISTORS
- 3976984 - LEVEL SHIFTING CIRCUIT DEVICE
- 3989955 - LOGIC CIRCUIT ARRANGEMENTS USING INSULATED-GATE FIELD EFFECT TRANSISTORS
- 4000429 - SEMICONDUCTOR CIRCUIT DEVICE
- 4065187 - SEMICONDUCTOR LATCH CIRCUIT USING INTEGRATED LOGIC UNITS AND SCHOTTKY DIODE IN COMBINATION
- 4069426 - COMPLEMENTARY MOS LOGIC CIRCUIT
- 4071774 - INTEGRATED INJECTION LOGIC WITH BOTH FAN IN AND FAN OUT SCHOTTKY DIODES, SERIALLY CONNECTED BETWEEN STAGES
- 4086500 - ADDRESS DECODER
- 4110634 - GATE CIRCUIT
- 4114049 - COUNTER PROVIDED WITH COMPLEMENTARY FIELD EFFECT TRANSISTOR INVERTERS
- 4114052 - PRESETTABLE DYNAMIC DELAY FLIP-FLOP CIRCUIT
- 4115706 - INTEGRATED CIRCUIT HAVING ONE-INPUT TERMINAL WITH SELECTIVELY VARYING INPUT LEVELS
- 4122360 - LOGIC CIRCUIT USING CMOS TRANSISTORS
- 4143390 - SEMICONDUCTOR DEVICE AND A LOGICAL CIRCUIT FORMED OF THE SAME

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

TOKYO SHIBAURA ELECTRIC CO., LTO. (CONTINUED)
- 4156154 - FLIP-FLOP CIRCUIT
- 4160173 - LOGIC CIRCUIT WITH TWO PAIRS OF CROSS-COUPLED NAND/NOR GATES
- 4164666 - ELECTRONIC APPARATUS USING COMPLEMENTARY MOS TRANSISTOR OYNAMIC CLOCKED LOGIC CIRCUITS
- 4168442 - CMOS FET OEVICE WITH ABNORMAL CURRENT FLOW PREVENTION
- 4185321 - SEMICONOUCTOR MEMORY WITH PULSE CONTROLLEO COLUMN LOAD CIRCUIT
- 4209713 - SEMICONOUCTOR INTEGRATED CIRCUIT OEVICE IN WHICH OIFFICULTIES CAUSEO BY PARASITIC TRANSISTORS ARE ELIMINATED
- 4209715 - LOGIC CIRCUIT
- 4217502 - CONVERTER PROOUCING THREE OUTPUT STATES
- 4236114 - APPARATUS FOR GENERATING PULSE WIDTH MODULATED WAVES
- 4260906 - SEMICONOUCTOR OEVICE AND LOGIC CIRCUIT CONSTITUTED BY THE SEMICONDUCTOR DEVICE
- 4301382 - I2L WITH PNPN INJECTOR

TOYO-KOGYO CO., LTO.
- 3950656 - STATE OETECTING APPARATUS

TRW INC.
- 3772536 - DIGITAL CELL FOR LARGE SCALE INTEGRATION
- 4135104 - REGENERATOR CIRCUIT
- 4170041 - LOGIC GATE UTILIZING CHARGE TRANSFER OEVICES
- 4215418 - INTEGRATED OIGITAL MULTIPLIER CIRCUIT USING CURRENT MODE LOGIC

TULL AVIATION CORPORATION
- 3950705 - NOISE REJECTION METHOD AND APPARATUS FOR OIGITAL OATA SYSTEMS

UNITED KINGOOM OF GREAT BRITAIN AND NORTHERN IRELAND, -
- 3543048 - REDUNOANT BINARY LOGIC CIRCUITS

UNITED STATES OF AMERICA, AIR FORCE
- 3479644 - BINARY NUMBER COMPARATOR CIRCUIT
- 3569731 - VOLTAGE LEVEL OETECTOR
- 3571732 - VOLTAGE CONTROLLEO PHASE SHIFTER
- 3937936 - EQUIPMENT SELF-REPAIR BY AOAPTIVE MULTIFUNCTION MOOULES
- 4038598 - PROBE CONTACT AND JUNCTION OETECTOR

UNITEO STATES OF AMERICA, ARMY
- 3422282 - LEVEL CONVERSION CIRCUIT FOR INTERFACING LOGIC SYSTEMS
- 3448388 - STROBE GATE CIRCUIT
- 3450895 - OIRECT COUPLED LOGIC CIRCUIT
- 3453447 - SELF-SYNCHRONIZING TUNNEL OIOE AND CIRCUIT
- 3529179 - LOGIC NOISE SUPPRESSOR
- 4103251 - STABILIZED OELAY LINE OSCILLATOR

UNITEO STATES OF AMERICA, OEPARTMENT OF ENERGY
- 4264955 - SIGNAL VOTER

UNITEO STATES OF AMERICA, NATIONAL AERONAUTICS AND SPACE AOM
- 3422440 - PLURAL RECORDER SYSTEM
- 3501701 - DIGITAL FREQUENCY OISCRIMINATOR
- 3512009 - EXCLUSIVE-OR OIGITAL LOGIC MOOULE
- 3577014 - MONOSTABLE MULTIVIBRATOR WITH COMPLEMENTARY NOR GATES
- 3621277 - FAST RESPONSE LOW POWER ORAIN LOGIC CIRCUITS
- 3700868 - LOGICAL FUNCTION GENERATOR
- 3808464 - HIGH ISOLATION R.F. SIGNAL SELECTION SWITCHES
- 3857045 - FOUR-PHASE LOGIC SYSTEM
- 3900741 - FAULT TOLERANT CLOCK APPARATUS UTILIZING A CONTROLLEO MINORITY OF CLOCK ELEMENTS

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

UNITED STATES OF AMERICA, NAVY
3528017 - PLURAL-INPUT, DROPOUT-INSENSITIVE SKEW-MEASURING CIRCUIT FOR MAGNETIC RECOROING TAPE
3530384 - PLURAL-INPUT DROPOUT AND NOISE DETECTION CIRCUIT FOR MAGNETIC RECOROING TAPE
3538443 - GENERAL PURPOSE LOGIC PACKAGE
3544809 - MULTIFUNCTIONAL CIRCUIT
3564596 - DECISION COUNTER
3567963 - FIELD EFFECT TRANSISTOR LOGIC GATE
3600687 - LOGIC ONE-SHOT
3612906 - PULSE SYNCHRONIZER
3614632 - DIGITAL PULSE WIDTH GENERATDR
3619669 - PULSED DIGITAL OELAY
3624518 - SINGLE PULSE SWITCH CIRCUIT
3721835 - HAROLIMITER, AUTOMATIC SYMMETRY CIRCUIT
3731075 - AUTOMATIC RATE TRACKER
3900742 - THRESHOLO LOGIC USING COMPLEMENTARY MOS OEVICE
3904891 - LOGIC CIRCUIT FOR TRUE AND COMPLEMENT OIGITAL OATA TRANSFER
3959665 - LOGIC CIRCUITS WITH INTERFACING SYSTEM
4051390 - PARALLEL/TIME-SHAREO VARIABLE TIME OELAY GENERATOR WITH COMMON TIMING CONTROL AND FAST RECOVERY
4125788 - VOLTAGE LEVEL SHIFTING DEVICE
4171526 - EVENT MARK DECOOER FOR USE WITH TIME CODE GENERATOR

UNITEO TECHNOLOGIES CORPORATION
3538498 - MAJORITY DATA SELECTING ANO FAULT INDICATING
3710271 - FET DRIVER FOR CAPACITIVE LOAOS
3728556 - REGENERATIVE FET CONVERTER CIRCUITRY

UNIVERSITE OE SHERBROOKE
3866147 - BALANCEO CORRELATEO TERNARY CODING SYSTEM

UNIVERSITY OF SOUTHERN CALIFORNIA
4242595 - TUNNEL OIOOE LOAD FOR ULTRA-FAST LOW POWER SWITCHING CIRCUITS

URANUS ELECTRONICS INC.
3765163 - ELECTRONIC TIMEPIECE

U.S. PHILIPS CORPORATION
3456199 - TWO LEVEL TO THREE LEVEL PULSE CDDE CONVERTER UTILIZING MODULO-2 LOGIC AND OELAYED PULSE FEEOBACK
3458825 - BISTABLE TRIGGER CIRCUIT COMPRISING TWO RELATIVELY COMPLEMENTARY OUTPUTS ANO TWO INPUTS AND A CLOCK PULSE INPUT
3515900 - LOGIC CIRCUIT ARRANGEMENTS
3515994 - DEVICE FOR REPROOUCING BIVALENT COOE ELEMENTS REGISTERED IN A MOVING SIGNAL CARRIER
3521086 - CIRCUIT ARRANGEMENT FOR LIMITING THE OUTPUT VOLTAGE OF A LOGICAL CIRCUIT
3535544 - MULTISTABLE CIRCUIT ARRANGEMENTS RESPONSIVE TO CLOCK PULSES (JK FLIP-FLOPS)
3560770 - TEMPERATURE CORRECTION OF A LOGIC CIRCUIT ARRANGEMENT
3588546 - BISTABLE TRIGGER CIRCUIT HAVING DIFFERENT VOLTAGE THRESHOLO
3590273 - FOUR PHASE LOGIC SYSTEMS
3591853 - FOUR PHASE LOGIC COUNTER
3591857 - MOST TRANSLATING ANO GATING CIRCUIT
3601626 - LOGIC ELEMENT
3676709 - FOUR-PHASE OELAY ELEMENT
3728534 - CONSTRUCTABLE LOGIC SYSTEM
3751683 - COMBINED DATA ANO SET-RESET FLIP-FLOP WITH PROVISIONS FOR ELIMINATING RACE CONOITIONS
3753005 - INTEGRATEO CIRCUIT COMPRISING STRIP-LIKE CONOUCTORS
3911269 - CIRCUIT ARRANGEMENT HAVING AT LEAST ONE CIRCUIT ELEMENT WHICH IS ENERGISEO BY MEANS OF RAOIATION AND SEMICONOUCTOR DEVIC E SUITABLE FOR USE IN SUCH A CIRCUIT ARRANGEMENT
4007385 - SERIALLY-CONNECTED CIRCUIT GROUPS FOR INTERGRATED INJECTION LOGIC
4009397 - LOGIC CIRCUIT

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

U.S. PHILIPS CORPORATION (CONTINUEO)
- 4109162 - MULTI-STAGE INTEGRATEO INJECTION LOGIC CIRCUIT WITH CURRENT MIRROR
- 4137465 - MULTI-STAGE INTEGRATEO INJECTION LOGIC CIRCUIT
- 4137469 - THRESHOLO-EFFECT INTEGRATEO INJECTION LOGIC CIRCUIT WITH HYSTERESIS
- 4158146 - OEVICE FOR COUPLING TRANSISTORS OPERATEO IN I+HU 2+B L TO A TRANSISTOR OPERATEO AT A HIGHER BIAS-CURRENT
- 4203042 - INTEGRATEO CIRCUIT
- 4229670 - INTEGRATEO CIRCUIT HAVING FIRST ANO SECONO INTERNAL CIRCUITS CONTROLLEO BY A COMMON INPUT TERMINAL
- 4242596 - INTEGRATEO INJECTION LOGIC CIRCUITS
- 4243896 - I\2/ L CIRCUIT WITH AUXILIARY TRANSISTOR
- 4286177 - INTEGRATEO INJECTION LOGIC CIRCUITS
- 4322634 - OEVICE FOR PROTECTION IN THE CASE OF O.C. SUPPLY-VOLTAGE OROP
- 4326136 - THRESHOLO CIRCUIT USING COMPLEMENTARY FIELO EFFECT TRANSISTORS

VOO AOOLF SCHINOLING AG
- 4132905 - CIRCUIT ARRANGEMENT FOR THE CONTROL OF A FORWARO-REARWARO-COUNTER

VEB BUCHUNGSMACHINENWERK KARL-MARX-STAOT
- 3461404 - OISCONNECTABLE PULSE GENERATOR

VEB POLYGRAPH LEIPZIG KOMBINAT FUR POLYGRAPHISCHE MASCHINEN
- 3831100 - PULSE SEQUENCE CONTROL CIRCUIT

WAGNER ELECTRIC CORPORATION
- 3777180 - SIGNAL-SEQUENCE CONTROL CIRCUIT

WANG LABORATORIES, INC.
- 3449555 - PARALLEL BINARY TO BINARY COOEO OECIMAL ANO BINARY COOEO OECIMAL TO BINARY CONVERTER UTILIZING CASCAOEO LOGIC BLOCKS

WESTERN OIGITAL CORPORATION
- 4049978 - MOS HIGH CURRENT ORIVE CIRCUIT

WESTERN ELECTRIC COMPANY, INC.
- 3461311 - SYSTEM FOR ANO A METHOO OF IMPLEMENTING A THREE VARIABLE LOGIC FUNCTION
- 3526840 - STEERING ANO TIMING CIRCUIT
- 3581108 - SINGLE OUTPUT SELECTING CIRCUIT EMPLOYING A PLURALITY OF INTERLOCKEO NOR-GATES
- 3624522 - LOGIC CIRCUITRY FOR MONITORING THE CYCLIC OPERATIONS OF A PAIR OF OEVICES

WESTINGHOUSE AIR BRAKE COMPANY
- 3430066 - UNIT GAIN FAIL-SAFE "ANO" CIRCUIT
- 4125784 - FAIL-SAFE OR GATE
- 4130764 - FAIL-SAFE OR LOGIC CIRCUIT

WESTINGHOUSE BRAKE + SIGNAL CO. LTO.
- 3809930 - STATIC RELAYING CIRCUIT

WESTINGHOUSE ELECTRIC CORP.
- 3430065 - LOGIC CIRCUIT UTILIZING BREAKOOWN OIOOES WITH OIFFERENT BREAKOOWN VOLTAGES
- 3452216 - LOGIC CIRCUIT
- 3525911 - SEMICONOUCTOR INTEGRATED CIRCUIT INCLUOING IMPROVEO OIOOE STRUCTURE
- 3526784 - SENSE AMPLIFIER ANO SIGNAL LEVEL TRANSLATOR
- 3539880 - MIS-FET PERMANENT REPAIR PHYSICAL OEVICE
- 3544778 - OECISION NETWORK
- 3546480 - MONITOR CIRCUIT FOR ASYNCHRONOUS OIGITAL SIGNALS FOR MAINTAINING OUTPUT SIGNAL LEVEL FOR OURATION OF APPLIEO HOLO SIGNAL
- 3553486 - HIGH NOISE IMMUNITY SYSTEM FOR INTEGRATEO CIRCUITS
- 3557383 - CONTROL LOGIC CIRCUIT
- 3560859 - SYNCHRONOUS ANTICOINCIOENCE GATE

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

WESTINGHOUSE ELECTRIC CORP. (CONTINUED)
- 3586982 - PULSE COUNT OETECTOR HAVING FAIL-SAFE FEATURES
- 3600604 - FAILSAFE LOGIC GATES
- 3601629 - BIDIRECTIONAL OATA LINE ORIVER CIRCUIT FOR A MOS FET MEMORY
- 3602705 - BINARY FULL ADOER CIRCUIT
- 3609479 - SEMICONDUCTOR INTEGRATED CIRCUIT HAVING MIS BIPOLAR TRANSISTOR ELEMENTS
- 3621278 - AUTOMATIC GENERATOR SYNCHRONIZING AND CONNECTING SYSTEM AND SYNCHRONIZER APPARATUS FOR USE THEREIN
- 3641511 - COMPLEMENTARY MOSFET INTEGRATED CIRCUIT MEMORY
- 3673429 - PSUEDO-AND GATE HAVING FAILSAFE QUALITIES
- 3733591 - NON-VOLATILE MEMORY ELEMENT
- 3743858 - SHIFT REGISTER
- 3751689 - ELECTRONIC LATCH CIRCUIT
- 3826930 - FAIL-SAFE OPTICALLY COUPLED LOGIC NETWORKS
- 3855536 - UNIVERSAL PROGRAMMABLE LOGIC FUNCTION
- 3895360 - BLOCK ORIENTED RANDOM ACCESS MEMORY
- 3999087 - MISSING PHASE OETECTION CIRCUIT FOR USE WITH THREE-PHASE POWER SOURCES
- 4031511 - CMOS COMPARATOR
- 4064405 - COMPLEMENTARY MOS LOGIC CIRCUIT
- 4109163 - HIGH SPEEO, RADIATION HARD COMPLEMENTARY MOS CAPACITIVE VOLTAGE LEVEL SHIFT CIRCUIT
- 4124900 - MEMORY USING INTERLEAVED ROWS TO PERMIT CLOSER SPACING
- 4147940 - MOS INTERFACE CIRCUIT
- 4179629 - FAILSAFE LOGIC FUNCTION APPARATUS
- 4188547 - MULTI-MODE CONTROL LOGIC CIRCUIT FOR SOLID STATE RELAYS
- 4206368 - SIGNAL ISOLATING TECHNIQUE

WISCONSIN ALUMNI RESEARCH FOUNDATION
- 3979602 - RESISTIVE NEURISTOR JUNCTIONS

WURLITZER COMPANY
- 4207792 - TRI-STATE ENCODING CIRCUIT FOR ELECTRONIC MUSICAL INSTRUMENT

XEROX CORPORATION
- 3461390 - OICOOE OECOOER TRANSLATING OICOOE OR THREE-LEVEL OIGITAL OATA SIGNAL INTO TWO-LEVEL FORM
- 4099071 - MONOLITHIC ELECTRONIC SCANNING DEVICE
- 4101788 - MOS BUFFER CIRCUIT
- 4133611 - TWO-PAGE INTERWEAVED RANOOM ACCESS MEMORY CONFIGURATION
- 4195352 - SPLIT PROGRAMMABLE LOGIC ARRAY

XEROX OATA SYSTEMS, INC.
- 3688127 - OIGITAL CIRCUIT LOGIC

ZAIOAN HOJIN HANOOTAI KENKYU SHINKOKAI
- 4198648 - INTEGRATED SEMICONOUCTOR DEVICE
- 4259681 - INTEGRATEO CIRCUIT
- 4266238 - SEMICONDUCTOR DEVICE HAVING HIGH-SPEED OPERATION AND INTEGRATEO CIRCUIT USING SAME
- 4270059 - STATIC INDUCTION TRANSISTOR LOGIC CIRCUIT
- 4284997 - STATIC INDUCTION TRANSISTOR AND ITS APPLIED OEVICES
- 4317127 - STATIC INOUCTION TRANSISTOR AND INTEGRATEO CIRCUIT UTILIZING SAME

ZENITH RAOIO CORPORATION
- 3716797 - INHIBITABLE RANDOM PULSE GENERATOR
- 4090143 - OIGITAL PHASE COMPARATOR WITH RESET

FISHER CONTROLS INTERNATIONAL, INC.
- 4319147 - MONITORING APPARATUS

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

FUJITSU LTD.
4321489 - VOLTAGE DETECTION CIRCUIT

GTE AUTOMATIC ELECTRIC LABS INC.
4314164 - COMPUTER CHANNEL ACCESS CIRCUIT FOR MULTIPLE INPUT-OUTPUT DEVICES

IFO SANITAR AB
4328597 - ADJUSTABLE WASH-BASIN

NIPPON TELEGRAPH & TELEPHONE PUBLIC CORP.
4330841 - LOGIC CIRCUIT WITH ASYMMETRICAL QUANTUM INTERFEROMETRIC CIRCUITS

INVENTORS OF INOIVIOUALLY OWNEO PATENTS (1/75- 6/82) (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
BARNES	AUSTEN	B.	337 SHEPPARO AVE. E.	PICKERING, ONTARIO		CA
4199727 - MALFUNCTION OETECTOR						
BRICE	MARILYN	J.	R.R. NO. 1	KING FERRY	NY	13081
4033524 - METHOO ANO APPARATUS FOR CONTROLLING EARTH ORBITING SATELLITES ANO VEHICLES INTER ALIA						
BRICE	NEIL	M.	R.R. NO. 1	KING FERRY	NY	
4033524 - METHOO AND APPARATUS FOR CONTROLLING EARTH ORBITING SATELLITES ANO VEHICLES INTER ALIA						
OUTE	JOHN	C	455 HILLOALE ORIVE	ANN ARBOR	MI	48105
3961200 - APPARATUS FOR CONSTRUCTING CONTROL CIRCUITS HAVING RELAY CIRCUIT FUNCTIONAL CHARACTERISTICS						
GIANFRANCO	VELO	O.	VIA VELO, 14	35014 FONTANIVA (PAO		IT
4277921 - THREE-OIMENSIONAL COMPONENTAL MOOULE AT +37 T+38 +O MOOIFIEO FOR THE INOUSTRIAL PREFORMATION OF BUILOINGS						
KATO	MAKOTO		36-1-1318, HIGASHIKANAMACHI1-C	KATSUSHIKA, TOKYO		JA
3987345 - INPUT SETTING TYPE PROGRAMMING RELAY						
KOKIN	VILYAM	N.	KORPUS 441, KV. 115	MOSCOW		SU
4243895 - INTEGRATEO INJECTION CIRCUIT						
KOPYTOV	ALEXANOR	MAXIMOVIC	ULITSA KARPINSKOGO, 3	KIEV		SU
4034238 - FIELO EFFECT TRANSISTOR INFORMATION TRANSFER CIRCUIT FOR USE IN STORAGE REGISTER						
KREMLEV	VYACHESLAV	Y.	KORPUS 423, KV. 81	MOSCOW		SU
4175240 - INTEGRATEO LOGIC CIRCUIT WITH A CURRENT SOURCE MADE AS A FIELO-EFFECT TRANSISTOR						
4243895 - INTEGRATEO INJECTION CIRCUIT						
LAVROV	VAOIM	V.	ULITSA 8 MARTA, 7, KV. 125	KHIMKI MOSKOVSKOI OB		SU
4243895 - INTEGRATEO INJECTION CIRCUIT						
LINNMAN	SVEN	N.	GOTTSUNOAV. 13	S18400 AKERSBERGA		SE
4175255 - OEVICE TO PROTECT AGAINST FLOW OF CURRENT						
MAECKER	KURT		KREUZSTRASSE 34	4 OUSSELOORF		OT
3911399 - OIGITAL INCREMENTAL EMITTER, ESPECIALLY FOR NUMERICAL CONTROL OF MACHINE TOOLS						
MISAIZU	TETSUO		C/O NIPPON ELECTRIC CO., LTO.,	MINATO-KU, TOKYO		JP
4264829 - MOS INVERTER-BUFFER CIRCUIT HAVING A SMALL INPUT CAPACITANCE						
MOELLER	CHARLES	R.	2133 OXFORO AVE.	CAROIFF-BY-THE-SEA	CA	92007
4218658 - NON-CONTEMPORANEOUS LOGIC ELEMENT ANO METHOO FOR SYNTHESIZING A CONOITION WHICH REPRESENTS A SEQUENCE						
MOROKAWA	SHIGERU		NO. 325-43, NARAHASHI	HIGASHIYAMATO, TOKYO		JA
4045692 - SOLIO STATE BINARY LOGIC SIGNAL SOURCE FOR ELECTRONIC TIMEPIECE OR THE LIKE						
MOUFAH	HUSSEIN	T.	3480 HAVENWOOO OR., APT. 203	MISSISSAUGA, ONTARIO		CA
4107549 - TERNARY LOGIC CIRCUITS WITH CMOS INTEGRATEO CIRCUITS						
NAZARIAN	ARTASHES	R.	PLOSCHAO JUNOSTI, 3, KV . 16	MOSCOW		SU
4243895 - INTEGRATEO INJECTION CIRCUIT						

INVENTORS OF INOIVIOUALLY OWNEO PATENTS (1/75- 6/82) (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
NAZARIAN	ARTASHES	R.	PLOSCHAO JUNOSTI, 3, KV. 16	MOSCOW		SU
4160918 - INTEGRATEO LOGIC CIRCUIT						
PATTERSON	COLIN	OAVEY	65 OOWNSVIEW CRESCENT	OTTAWA, ONTARIO		CA
4052558 - OATA TRANSMISSION SYSTEM						
PROKOFIEV	JURY	VLAOIMIRO	ULITSA SCHERBAKOVA, 73, KV. 13	KIEV		SU
4034238 - FIELO EFFECT TRANSISTOR INFORMATION TRANSFER CIRCUIT FOR USE IN STORAGE REGISTER						
SEIB	JAMES	N.	R.R. 1	WILLIAMS	IN	47470
4011482 - ELECTRIC CIRCUIT CONTROL SYSTEM USING EXCLUSIVE "OR" GATE						
SEKIYA	FUKUO		NO. 28-206-103, 4-CHOME	MIOORI-CHO, TOKOROZA		JA
4045692 - SOLIO STATE BINARY LOGIC SIGNAL SOURCE FOR ELECTRONIC TIMEPIECE OR THE LIKE						
SIOORENKO	VLAOIMIR	PAVLOVICH	ULITSA SCHERBAKOVA, 92V, KV. 2	KIEV		SU
4034238 - FIELO EFFECT TRANSISTOR INFORMATION TRANSFER CIRCUIT FOR USE IN STORAGE REGISTER						
SIROTA	ALEXANOR	YAKOVLEVI	ULITSA SCHERBAKOVA, 74B, KV. 8	KIEV		SU
4034238 - FIELO EFFECT TRANSISTOR INFORMATION TRANSFER CIRCUIT FOR USE IN STORAGE REGISTER						
SLAOKOV	VIKTOR	I.	BEREZOVAYA ALLEYA, 6, KV. 77	MOSCOW		SU
4243895 - INTEGRATEO INJECTION CIRCUIT						
SUGAI	TETUYA		50-17, GOTOKUJI 1-CHOME	SETAGAYA, TOKYO		JA
3993954 - ELECTRIC COMMUNICATION SYSTEM						
TAKEI	AKIRA			SAGAMIHARA		JA
3975647 - BOOTSTRAP CIRCUIT						
TANAKA	MAMORU		5-16-7	HIGASHI-JUJO, KITA-K		JP
4336601 - REWRITABLE PROGRAMMABLE LOGIC ARRAY						
TAYAKIN	JURY	VASILIEVI	ULITSA SCHERBAKOVA, 98V, KV. 1	KIEV		SU
4034238 - FIELO EFFECT TRANSISTOR INFORMATION TRANSFER CIRCUIT FOR USE IN STORAGE REGISTER						
VENKOV	BORIS	V.	KORPUS 206, KV. 46	MOSCOW		SU
4243895 - INTEGRATED INJECTION CIRCUIT						
WRIGHT	FREO	R.	3620 BLUFF PL. +190 2	SAN PEORO	CA	90731
4334212 - ELECTRONIC LATCH FOR OIGITALLY ACTUATING A LOAO						

PATENTS (1/63- 6/82) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN THE OATA BASE

3440440 - INPUT OUTPUT CIRCUIT
3450967 - SELENIUM MEMORY CELL CONTAINING SILVER UP TO 2 ATOMIC PERCENT AOJACENT THE RECTIFYING CONTACT
3514642 - ELECTRICALLY CONTROLLEO SWITCH
3527959 - TRANSISTOR NOR GATE
3555290 - SECONO-HIGHEST REOUNOANT VOLTAGE SELECTOR
3581241 - SIOE BANO GENERATOR HAVING STEP CONTROLLEO MOOULATION

PATENTS (1/63- 6/82) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN THE OATA BASE

3601634 - FIELO EFFECT TRANSISTOR MULTIPLEXING CIRCUIT FOR TIME SHARING A COMMON CONOUCTOR
3613055 - REAO-ONLY MEMORY UTILIZING SERVICE COLUMN SWITCHING TECHNIQUES
3617903 - CONOITION RESPONSIVE HIGH VOLTAGE GATE
3631528 - LOW POWER CONSUMPTION COMPLEMENTARY ORIVER ANO COMPLEMENTARY BIPOLAR BUFFER CIRCUITS
3652906 - MOSFET OECOOER TOPOLOGY
3656007 - VOLTAGE OEPENOENT PHASE SWITCH
3671876 - PULSE-PHASE COMPARATORS
3675043 - HIGH SPEEO OYNAMIC BUFFER
3683201 - LOGIC INTERCONNECTIONS
3689779 - CONTROLLEO GUNN-EFFECT OEVICE
3714465 - ANALOG OECISION CIRCUIT
3739200 - FET INTERFACE CIRCUIT
3771145 - AOORESSING AN INTEGRATEO CIRCUIT REAO-ONLY MEMORY
3798554 - OIGITAL SEQUENTIAL CIRCUIT
3803426 - HIGH SPEEO LOGICAL GATES
3805168 - CELL FOR SEQUENTIAL CIRCUITS AND CIRCUITS MAOE WITH SUCH CELLS
3808457 - OYNAMIC LOGIC OEVICE
3855481 - N-STATE LOGIC CIRCUIT

3409800 3416008 3416142 3417265 3418493 3071699 3071738 3073970 3074638 3074639 3074640 3075085
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PATENTS (1/63- 6/82) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN THE DATA BASE

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3418494	3418498										

DIGITAL LOGIC CIRCUITS

Selected Patents

Monolithic digital logic circuits are generally grouped into categories labeled as "families." Each logic family is derived from a different, relatively simple circuit which functions as a logical building block for more complex circuits. Some of the more common families constructed of bipolar transistors are:

Resistor - Transistor Logic	(RTL)
Diode - Transistor Logic	(DTL)
Transistor - Transistor Logic	(TTL)
Emitter - Coupled Logic	(ECL)
Integrated Injection Logic	(I^2L)

In addition there are the Field Effect Transistor (FET) families of p-channel mos (PMOS), n-channel MOS (NMOS) and complementary-symmetry MOS (CMOS) logic. These names are derived from their component parts, i.e., p-channel and n-channel metal-oxide silicon (MOS) field effect transistors (FET's) and p-channel/n-channel MOSFET pairs, respectively.

These building blocks can be combined within a single family to yield circuits which perform non-arithmetical operations such as selecting, searching, sorting, matching and comparing. Furthermore, with proper interfacing, circuits comprised of different logic families can be combined to perform these and other complex logical functions.

The following 10 patents were selected as being of particular interest in the field of digital logic circuitry. The first four patents below are examples of bipolar transistor logic families. The next four patents are examples of MOS logic. The ninth patent is a circuit which combines bipolar and MOS transistors and the tenth patent is a system for designing a digital logic circuit to accomplish a desired complex function.

* * *

THIS INVENTION USES A SINGLE MULTIPLE BASE AND/OR MULTIPLE EMITTER TRANSISTOR TO ACCOMPLISH A BASIC LOGICAL FUNCTION. THE PATENT DESCRIBES SEVERAL EMBODIMENTS OF BOTH NOR AND AND GATES CONSTRUCTED OF A SINGLE TRANSISTOR. THE USE OF SINGLE TRANSISTOR LOGIC GATES RESULTS IN DECREASED POWER CONSUMPTION, INCREASED SPEED OF OPERATION AND INCREASED PACKING DENSITY.

United States Patent [19]

Fulkerson

[11] **4,119,997**

[45] **Oct. 10, 1978**

[54] **DOT-AND LOGIC GATE DEVICE INCLUDING MULTIEMITTER TRANSISTOR**

[75] Inventor: **David E. Fulkerson, Minnetonka, Minn.**

[73] Assignee: **Honeywell Inc., Minneapolis, Minn.**

[21] Appl. No.: **789,036**

[22] Filed: **Apr. 20, 1977**

Related U.S. Application Data

[60] Division of Ser. No. 670,811, Mar. 26, 1976, Pat. No. 4,032,796, and a continuation-in-part of Ser. No. 497,018, Aug. 13, 1974, Pat. No. 3,970,866.

[51] **Int. Cl.**[2] **H01L 29/72**

[52] **U.S. Cl.** ..... **357/36**; 357/40; 357/51; 357/86; 307/218; 307/299 A; 307/303

[58] **Field of Search** ..... 357/36, 40, 86, 51; 307/218, 303, 299 A

[56] **References Cited**

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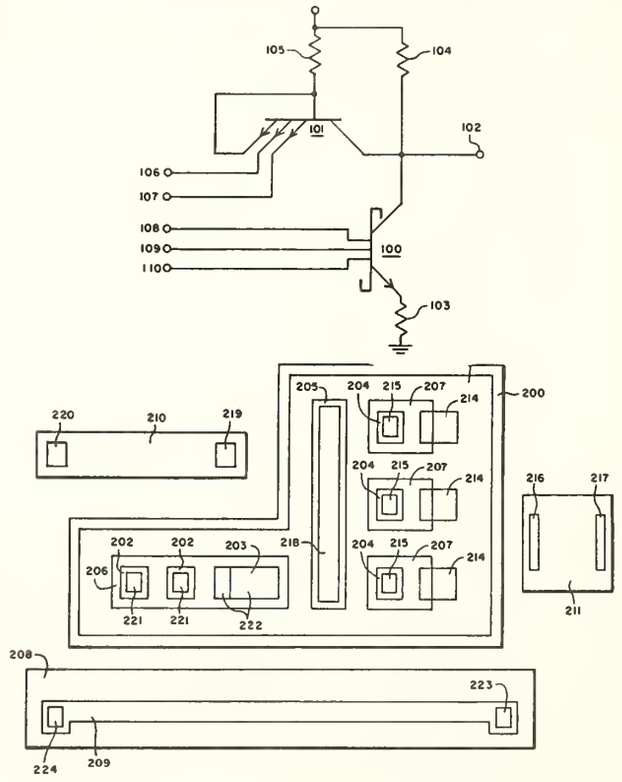
Primary Examiner—Joseph E. Clawson, Jr.
Attorney, Agent, or Firm—Theodore F. Neils

[57] **ABSTRACT**

A logic family is provided capable of accomplishing a logic function for each transistor used, i.e. one transistor per logic gate. A plurality of logic gate types are shown, each capable of a different logic function. These logic gate types can be connected with one another to provide the "DOT—AND" logic function.

7 Claims, 12 Drawing Figures



THE USE OF SCHOTTKY BARRIER DIODES AND TRANSISTORS IN INTEGRATED LOGIC CIRCUITS IMPROVES PACKING DENSITY AND FAN-OUT CAPABILITY OF SUCH CIRCUITS. FAN-OUT IS THE NUMBER OF IDENTICAL GATE INPUTS WHICH CAN BE DRIVEN BY A PARTICULAR GATE. IN THIS INVENTION, THE EFFECTS OF THE RESISTANCE OF THE METAL PATHS WHICH INTERCONNECT CELLS IN A SCHOTTKY TRANSISTOR LOGIC (STL) CIRCUIT ARE OVERCOME BY USING RELATIVELY LARGE RESISTORS TO DRIVE THE BASE OF THE TRANSISTOR IN THE NEXT CELL. THE RESISTANCE OF THE METAL INTERCONNECTING PATH IS THEN PLACED IN SERIES WITH THIS DRIVING RESISTANCE AND, THEREFORE, BECOMES NEGLIGIBLE.

United States Patent [19]

Gani et al.

[11] **4,129,790**

[45] **Dec. 12, 1978**

[54] **HIGH DENSITY INTEGRATED LOGIC CIRCUIT**

[75] Inventors: **Venkappa L. Gani; Frank A. Montegari,** both of Wappingers Falls, N.Y.

[73] Assignee: **International Business Machines Corporation,** Armonk, N.Y.

[21] Appl. No.: **862,704**

[22] Filed: **Dec. 21, 1977**

[51] **Int. Cl.**[2] **H03K 19/08;** H03K 19/12; H03K 19/20

[52] **U.S. Cl.** ..... **307/203;** 307/200 A; 307/208; 307/213; 307/218; 307/317 A

[58] **Field of Search** ..... 307/203, 208, 200 A, 307/213, 214, 215, 218, 317 A

[56] **References Cited**

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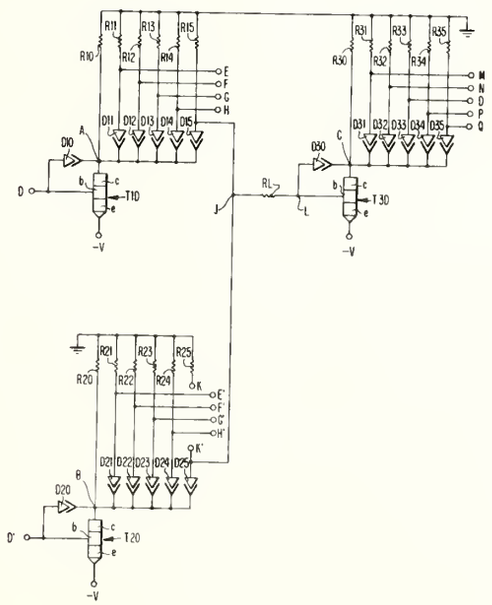
Chen et al., "Schottky Transistor Logic Macro Receive Cell"; *IBM Tech. Discl. Bull.*, vol. 20, No. 2, pp. 608-610; 7/1977.

Primary Examiner—Larry N. Anagnos
Attorney, Agent, or Firm—Theodore E. Galanthay

[57] **ABSTRACT**

The disclosed logic circuit includes one transistor and a plurality of Schottky barrier diodes in each logic circuit "cell," a plurality of such cells being interconnected to perform desired logic functions. Cell interconnections are made by interconnecting metallurgy which can have a relatively high resistance with relatively long interconnecting paths between a sending circuit cell and a receiving circuit cell. The undesirable effects of this metallurgy resistance are overcome by driving the base of the receiving transistor through a base drive resistor in the sending cell.

9 Claims, 4 Drawing Figures



THIS INVENTION TEACHES THE PRODUCTION OF A 3-WAY EXCLUSIVE OR FUNCTION ON A LOGIC CIRCUIT WHICH EXHIBITS ONLY A SINGLE STAGE LOGIC DELAY FROM INPUT TO OUTPUT. A 3-WAY EXCLUSIVE OR GIVES A "1" OUTPUT WHENEVER A 2, 3, 4 OR 8 IS INPUT. IN THIS CIRCUIT, A 3-WAY OR OUTPUT IS COMBINED WITH THE OUTPUT OF A TWO AND ONLY TWO LOGIC CIRCUIT IN A DOT-AND CIRCUIT SUCH THAT THE OR OUTPUT IS INHIBITED WHENEVER TWO OF THE THREE INPUTS ARE "1." TWO EMBODIMENTS ARE DISCLOSED. THE FIRST USES HIGH SPEED SCHOTTKY DTL AND THE SECOND USES HIGH SPEED CURRENT SWITCHES MADE UP OF BIPOLAR TRANSISTORS.

United States Patent [19]

Malaviya

[11] **4,319,148**

[45] **Mar. 9, 1982**

[54] **HIGH SPEED 3-WAY EXCLUSIVE OR LOGIC CIRCUIT**

[75] Inventor: **Shashi D. Malaviya, Fishkill, N.Y.**

[73] Assignee: **International Business Machines Corp., Armonk, N.Y.**

[21] Appl. No.: **107,810**

[22] Filed: **Dec. 28, 1979**

[51] Int. Cl.³ **H03K 19/21; H03K 19/013**

[52] U.S. Cl. **307/471**; 307/455; 307/458; 307/470

[58] Field of Search 307/455, 457, 458, 464, 307/466, 467, 470, 471, 472; 364/784

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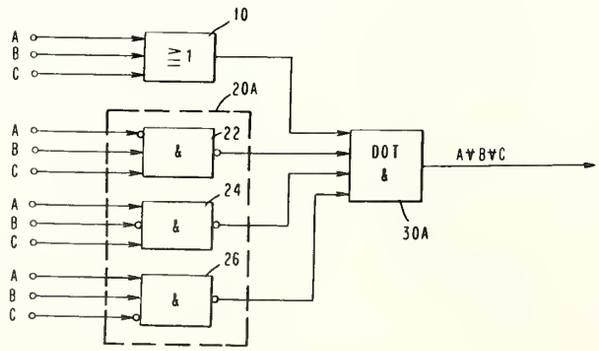
Primary Examiner—Larry N. Anagnos

Attorney, Agent, or Firm—Edward W. Brown

[57] **ABSTRACT**

A 3-way Exclusive OR function is performed in an essentially single stage logic delay. A 3-way OR circuit produces a logical "1" output whenever at least one of three input operands is "1". A Two And Only Two logic circuit produces a logical "0" output when two and only two of the three input operands are "1". The outputs of the OR circuit and the Two And Only Two logic circuits are DOT-ANDed to provide a desired Exclusive OR function. In one form of the invention, the Two And Only Two logic circuit comprises three Schottky diode transistor NAND circuits each having two normal inputs and one inhibit input with the inhibit input of each of the three NAND circuits being connected to receive a different one of the three input operands while the two normal inputs being connected to receive the remaining ones of the three input operands. The OR circuit comprises four transistors having their emitters coupled to a common current source. The base of one of the four transistors is connected to a reference potential while the bases of the other three transistors are connected to receive respective one of the three input operands. Outputs of the three NAND circuits and the output of the 3-way OR circuit are DOT-ANDed at an input of an emitter follower output stage.

13 Claims, 5 Drawing Figures



THIS INVENTION, INTENDED FOR USE IN TTL AND DTL INTEGRATED CIRCUITS, IS DESIGNED TO OFFSET THE EFFECTS OF THE SO-CALLED "MILLER CURRENT." A CONVENTIONAL TTL OR DTL DEVICE EXHIBITS A HIGH OR LOW VOLTAGE OUTPUT WHEN A "PULLUP" OR A "PULLDOWN" SWITCHING ELEMENT, RESPECTIVELY, IS TURNED ON. THE MILLER CURRENT EFFECT TENDS TO RETARD TURN-OFF OF THE PULLDOWN ELEMENT DURING A LOW TO HIGH TRANSITION OF THE DEVICE DUE TO THE RELATIVELY LARGE BASE-COLLECTOR CAPACITANCE OF THE PULLDOWN TRANSISTOR. IN THE INVENTIVE CIRCUIT, AN ACTIVE SWITCHING ELEMENT IS PROVIDED TO DISCHARGE THE CAPACITIVE FEEDBACK MILLER CURRENT TO GROUND DURING THE LOW TO HIGH TRANSITION. THIS ELIMINATES THE CURRENT SPIKES AND ACCOMPANYING NOISE AND WASTE OF POWER WHICH NORMALLY RESULT FROM THE MILLER CURRENT EFFECT.

United States Patent [19]

Bechdolt

[11] **4,321,490**

[45] **Mar. 23, 1982**

[54] **TRANSISTOR LOGIC OUTPUT FOR REDUCED POWER CONSUMPTION AND INCREASED SPEED DURING LOW TO HIGH TRANSITION**

[75] Inventor: **Robert W. Bechdolt, Portland, Me.**

[73] Assignee: **Fairchild Camera and Instrument Corporation, Mt. View, Calif.**

[21] Appl. No.: **34,380**

[22] Filed: **Apr. 30, 1979**

[51] **Int. Cl.**[3] **H03K 19/088;** H03K 19/084; H03K 19/013

[52] **U.S. Cl.** **307/456;** 307/443; 307/458; 307/547; 307/561

[58] **Field of Search** ..... 307/203, 213, 214, 215, 307/270, 280, 300, 317 A, 443, 456, 458, 547, 561

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4,042,840	8/1977	Chan	307/215 X
4,092,551	5/1978	Howard et al.	307/270 X
4,131,808	12/1978	Kuo	307/270
4,191,899	3/1980	Tomczak et al.	307/215 X

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Chang et al., IBM Tech. Disclosure Bulletin, vol. 18, No. 11, pp. 3635–3636, 4/76.

Klara et al., IBM Technical Disclosure Bulletin, vol. 16, No. 11, p. 3598, 4/74.

Berndlmaier et al., IBM Technical Disclosure Bulletin, vol. 18, No. 5, pp. 1404–1405, 10/75.

Kronlage, 1971 IEEE Int'l. Convention Digest, Session 3B, Paper 3B.5, pp. 144–145, 3/71.

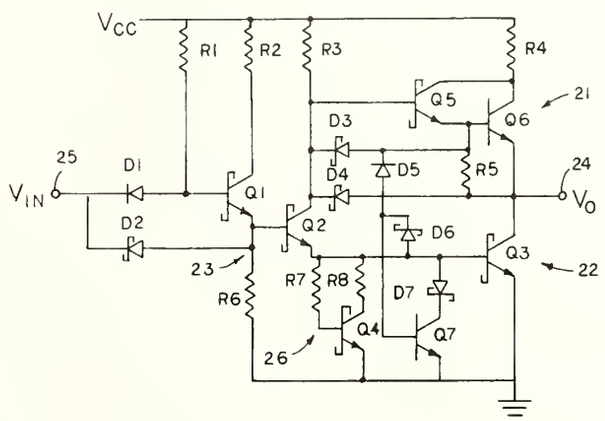
Primary Examiner—Larry N. Anagnos

Attorney, Agent, or Firm—Paul J. Winters; Theodore S. Park; Ronald J. Meetin

[57] **ABSTRACT**

In a transistor logic output device the improvement comprising an active element discharging transistor coupled between the base of the pulldown element transistor and ground or low potential for actively controlling a route to ground or low potential for diverting and discharging so-called capacitive feedback Miller current generated during the low to high voltage transition at the output of the device resulting from base-collector junction capacitance in the pulldown element transistor. The invention includes capacitive coupling means coupled at the base of the active element discharging transistor to follow changes in voltage at the device output and capacitively feed back current during transistion from low to high potential at the device output for driving the base of the discharge transistor thereby providing a low impedance path to ground or low potential at the base of the pulldown element transistor for diverting and discharging capacitive Miller feedback current.

10 Claims, 8 Drawing Figures



THIS INVENTION USES DEPLETION MODE ISOLATION TRANSISTORS AND LOAD TRANSISTORS WHICH ARE COMMON TO TWO ADJACENT STAGES IN A PLURAL STAGE MOSFET LOGIC CIRCUIT. THIS YIELDS AN FET LOGIC CIRCUIT WHICH EXHIBITS LOGIC VOLTAGE SWINGS WHICH ARE MUCH LESS THAN THE INPUT VOLTAGE RANGE. THE RESULTS ARE REDUCED POWER CONSUMPTION AND HEAT DISSIPATION REQUIREMENTS AND IMPROVED CIRCUIT PERFORMANCE OVER CONVENTIONAL FET LOGIC CIRCUITS WHICH EXHIBIT LOGIC VOLTAGE SWINGS SUBSTANTIALLY EQUAL TO THE INPUT VOLTAGE RANGE.

United States Patent [19]

Blaser et al.

[11] **4,110,633**

[45] **Aug. 29, 1978**

[54] **DEPLETION/ENHANCEMENT MODE FET LOGIC CIRCUIT**

[75] Inventors: **Eugene Martin Blaser**, Hopewell Junction; **Donald Adelbert Conrad**, Fishkill, both of N.Y.

[73] Assignee: **International Business Machines Corporation**, Armonk, N.Y.

[21] Appl. No.: **811,737**

[22] Filed: **Jun. 30, 1977**

[51] **Int. Cl.**[2] **H03K 19/08**; H03K 19/34; H03K 19/32; H03K 17/60

[52] **U.S. Cl.** **307/205**; 307/214; 307/215; 307/218; 307/270; 307/DIG. 1

[58] **Field of Search** ..... 307/205, 214, 215, 218, 307/264, 270, DIG. 1, DIG. 5

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,623,132	11/1971	Green	307/205
3,832,574	8/1974	Leehan	307/215 X
3,943,377	3/1976	Suzuki	307/215 X
3,991,326	11/1976	Kawagde et al.	307/270

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Freeman et al., "Level Shifting Circuit", *IBM Tech. Discl. Bull.*, vol. 18, No. 5, p. 1450, 10/1975.

Lohman, "Applications of MOSFETs in Electronics", *SCP and Solid-State Technology*, (pub.), pp. 23–29, 3/1966.

Askin et al., "Level Converting Circuit", *IBM Tech. Discl. Bull.*, vol. 18, No. 11, p. 3723, 4/1976.

Elliott et al., "Regenerative TTL Receiver Using Enhancement and Depletion FET Devices", *IBM Tech. Discl. Bull.*, vol. 18, No. 10, pp. 3259–3260, 3/1976.

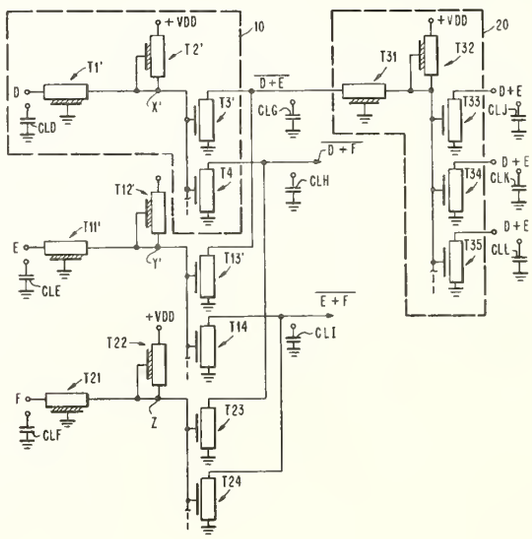
Primary Examiner—Larry N. Anagnos

Attorney, Agent, or Firm—Theodore E. Galanthay

[57] **ABSTRACT**

Disclosed is a field effect transistor (FET) logic circuit which advantageously combines enhancement and depletion mode field effect transistors. A depletion mode input transistor is connected between an input node and an intermediate node and has its gating electrode connected to a fixed potential such as ground. A self-biased depletion mode field effect load transistor is connected between a positive potential and the same intermediate node to which the gating electrode of one or more enhancement mode field effect transistors are also connected. The source electrodes of the enhancement mode field effect transistors are connected to a fixed source of potential such as ground while the drain electrodes of the enhancement mode field effect transistors provide open drain outputs to similarly constructed subsequent logic stages. A number of these open drain logic outputs may be connected together to form DOT logic configurations and the potential swing at these open drain outputs, being a function of the threshold voltage of the subsequent stage input device, is substantially less than the potential difference between the fixed positive and ground supply potentials.

11 Claims, 6 Drawing Figures



A TYPICAL MOS INTEGRATED LOGIC CIRCUIT INCLUDES AN OUTPUT NODE WHICH IS CONNECTED TO GROUND VIA AN ACTIVE SWITCH WHEN A LOW STATE IS DESIRED AND CONNECTED TO A SUPPLY VOLTAGE VIA A LOAD WHEN A HIGH STATE IS DESIRED, THE ACTIVE SWITCH BEING DEACTIVATED. WHEN AN ACTIVE ELEMENT IS ALSO USED FOR THE LOAD, INDIVIDUAL CIRCUIT SPEED IS INCREASED. MULTISTAGE CIRCUITS REQUIRE SEPARATE CLOCKING SIGNALS TO THE INDIVIDUAL STAGES SO THAT LATER STAGES ARE NOT PREMATURELY SWITCHED TO LOW STATES. THIS INVENTION USES A SINGLE CLOCK SOURCE TO SUPPLY CLOCK SIGNALS TO ALL STAGES OF A MULTISTAGE CIRCUIT BY INTRODUCING ON-CHIP DELAY ELEMENTS BETWEEN THE CLOCK SOURCE AND SUBSEQUENT STAGES. THE ELIMINATION OF ADDITIONAL CLOCK SOURCES RESULTS IN GREATER PACKING DENSITY AND IMPROVED SPEED OF OPERATION.

United States Patent [19]

Cooper, Jr. et al.

[11] **4,291,247**

[45] **Sep. 22, 1981**

[54] **MULTISTAGE LOGIC CIRCUIT ARRANGEMENT**

[75] Inventors: **James A. Cooper, Jr.; Robert H. Krambeck**, both of Warren, N.J.

[73] Assignee: **Bell Telephone Laboratories, Incorporated**, Murray Hill, N.J.

[21] Appl. No.: **77,753**

[22] Filed: **Sep. 21, 1979**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 860,339, Dec. 14, 1977, abandoned.

[51] **Int. Cl.**[3] **H03K 19/017; H03K 19/096**

[52] **U.S. Cl.** **307/481**; 307/443; 307/452

[58] **Field of Search** 307/203, 205, 208, 215

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,518,451	6/1970	Booher	307/205 X
3,551,693	12/1970	Burns et al.	307/205
3,601,627	8/1971	Booher	307/205
3,852,625	12/1974	Kubo	307/205 X
3,883,802	5/1975	Puri	307/205 X
3,917,958	11/1975	Hatsukano	307/205
3,943,377	3/1976	Suzuki	307/205
3,989,955	11/1976	Suzuki	307/205
4,040,015	8/1977	Fukuda	307/205 X
4,069,429	1/1978	White et al.	307/205 X
4,140,927	2/1979	Feucht	307/205 X

OTHER PUBLICATIONS

Lohman, "Applications of MOS FET's in Microelectronics"; *SCP and Solid-State Technology*; pp. 23-29; 3/1966.

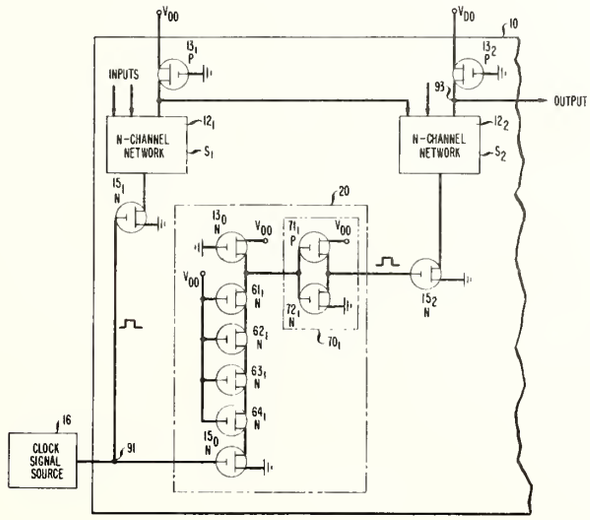
MOS Integrated Circuits-Microelectronics Series-1972; "2-Phase Ratioed Logic"; p. 262.

Primary Examiner—Larry N. Anagnos
Attorney, Agent, or Firm—Herbert M. Shapiro

[57] **ABSTRACT**

Logic circuits, particularly of the integrated semiconductor type, are accessed at improved speeds by preventing pull-ups from occurring during the access time and by the inclusion of on-chip delay circuitry to avoid switching later stages in a manner to lose information while output nodes of earlier stages are high. All stages are activated in response to a single clock pulse edge.

6 Claims, 5 Drawing Figures



THIS PATENT IS AN EXAMPLE OF A PROGRAMMED LOGIC ARRAY OR PLA. PLA'S HAVE A PRELIMINARY MATRIX CALLED A "SEARCH" SECTION INTO WHICH A BIT PATTERN IS ENTERED WHICH SELECTS A CERTAIN LOGIC FUNCTION TO BE PERFORMED BY THE ARRAY. THIS IS THE "PROGRAMMING" STEP. A "PREARRAY LOGIC" SECTION IS USED TO PROVIDE ALL LOGICAL COMBINATIONS OF THE INPUT BITS ON SEPARATE INPUT LINES TO THE "SEARCH" MATRIX. IN THE PRESENT INVENTION, THE EFFECTS OF THE LARGE CAPACITANCE CAUSED BY THE FAN-OUT OF THE "PREARRAY LOGIC" ARE MINIMIZED BY USING LOAD ISOLATING FET PUSH-PULL DRIVERS TO ISOLATE THE "PREARRAY LOGIC" FROM THE "SEARCH" MATRIX.

United States Patent [19]

Schuster

[11] **4,295,064**

[45] **Oct. 13, 1981**

[54] **LOGIC AND ARRAY LOGIC DRIVING CIRCUITS**

[75] Inventor: **Stanley E. Schuster**, Granite Springs, N.Y.

[73] Assignee: **International Business Machines Corporation**, Armonk, N.Y.

[21] Appl. No.: **920,943**

[22] Filed: **Jun. 30, 1978**

[51] Int. Cl.[3] **H03K 19/173**; H03K 19/20; H03K 19/094

[52] U.S. Cl. **307/468**; 307/270

[58] Field of Search 307/203, 205, 207, 270, 307/445, 465, 468; 364/716, 718

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,806,880	4/1974	Spence	307/205 X
3,946,245	3/1976	McClaughry	307/205
3,993,919	11/1976	Cox et al.	307/205 X
4,001,601	1/1977	Schuster	307/205
4,032,894	6/1977	Williams	307/205 X
4,057,787	11/1977	Heuer et al.	307/205 X
4,071,783	1/1978	Knepper	307/205 X
4,103,189	7/1978	Perlegos et al.	307/205 X
4,110,633	8/1978	Blaser et al.	307/205
4,123,669	10/1978	Devine et al.	307/205
4,129,794	12/1978	Dickson et al.	307/DIG. 1 X
4,140,921	2/1979	Balasubramanian et al.	307/205 X

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52-39354	3/1977	Japan	307/270

OTHER PUBLICATIONS

Balasubramanian et al., "Two-Bit Partitioning Driver"; *IBM Tech. Discl. Bull.;* vol. 18, No. 9, pp. 2958–2959; 2/1976.

Delahanty et al., "PLA Driver with Integral Race Prevention"; *IBM Tech. Discl. Bull.;* vol. 19, No. 1, pp. 152–153; 6/1976.

Aoki et al., "Driver Circuit Using Enhancement Depletion FET", *IBM Tech. Discl. Bull.;* vol. 16, No. 11, p. 3713; 4/1974.

Blaser et al., "FET Logic Configuration"; 1978 IEEE—Int'l. Solid-State Circuits Conference, 2/15/78; pp. 14–15 (Digest of Technical Papers).

Fleisher et al., "An Introduction to Array Logic"; *IBM Journal of Research and Development;* pp. 98–109; 3/1975.

HSU, "True, Push-Pull Driver"; IBM Tech. Discl. Bull.; vol. 19, No. 3, pp. 998–999; 8/76.

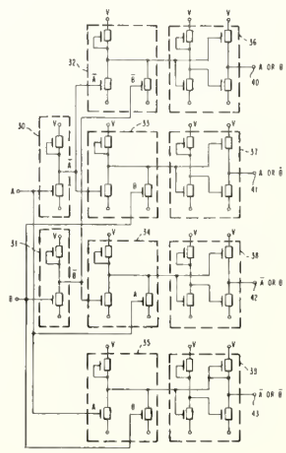
Primary Examiner—Larry N. Anagnos

Attorney, Agent, or Firm—Alvin J. Riddles

[57] **ABSTRACT**

A push-pull driver circuit wherein the input signals is applied to turn on one of two transistors mounted in series and the inversion of that signal is applied to the second transistor in the series path and the output taken from between them operates to isolate the load and since one and only one of the two transistors in the series path is conducting there is a path to charge and discharge the load capacitance but no path through both devices for power dissipation. The driver circuit can be built into a 2-bit partitioning circuit which in turn, when used with a programmed logic array and the relative capacitance of the various parts being isolated from each other by a coupling circuit, the resulting assembly provides a high performance programmed array logic device.

3 Claims, 8 Drawing Figures



THIS INVENTION USES CMOS LOGIC TO CREATE A STABLE CLOCKED IGFET LOGIC CIRCUIT. SUCH CLOCKED IGFET CIRCUITS ARE GENERALLY UNSTABLE SINCE, DURING A LOGICAL "ONE" STATE, THE PRECHARGE TRANSISTOR, ALTHOUGH BIASED OFF, LOSES THE STORED CHARGE THROUGH VARIOUS CHARGE LOSS MECHANISMS SUCH AS REVERSE PN-JUNCTION LEAKAGE AT SOURCE AND DRAIN JUNCTIONS. IN THIS CIRCUIT THE PRECHARGE TRANSISTOR WHICH IS NORMALLY BIASED OFF IS INSTEAD BIASED ON BUT AT A REDUCED CONDUCTANCE LEVEL SO THAT THE STORED CHARGE IS REPLENISHED DURING A LOGICAL "ONE" STATE. THIS GREATLY INCREASES THE STABILITY OF THE CIRCUIT.

United States Patent [19]

Sampson, III

[11] **4,330,722**

[45] **May 18, 1982**

[54] **CLOCKED IGFET LOGIC CIRCUIT**

[75] Inventor: **George P. Sampson, III,** Bernardsville, N.J.

[73] Assignee: **Bell Telephone Laboratories, Incorporated,** Murray Hill, N.J.

[21] Appl. No.: **178,899**

[22] Filed: **Aug. 18, 1980**

[51] **Int. Cl.**[3] **H03K 19/003;** H03K 19/096; H03K 19/20

[52] **U.S. Cl.** **307/443;** 307/452

[58] **Field of Search** 307/443, 449, 452–453, 307/463, 481, 577, 579, 583

[56] **References Cited**

U.S. PATENT DOCUMENTS

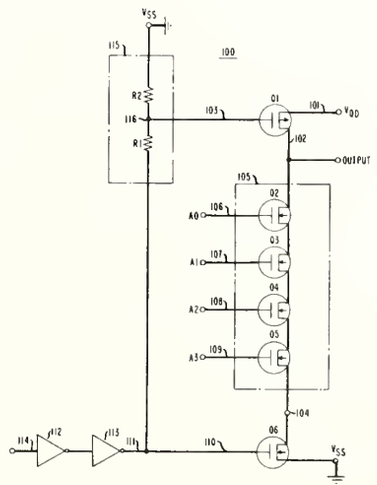
3,479,523	11/1969	Pleshko	307/443
3,551,693	12/1970	Burns et al.	307/452 X
3,825,888	7/1974	Kawagoe	307/449 X
3,942,162	3/1976	Buchanan	307/449 X
3,959,782	5/1976	Dunn	307/443 X
4,247,921	1/1981	Itoh et al.	307/463 X

Primary Examiner—Larry N. Anagnos
Attorney, Agent, or Firm—Arthur J. Torsiglieri

[57] **ABSTRACT**

A clocked IGFET logic circuit comprises a precharge transistor having its channel connected between a V_{DD} supply terminal and an output terminal, a functional network connected between the output terminal and a switch ground node, the network containing a plurality of transistors each having its gates connected to receive a respective one of a plurality of input signals and its channel connected together with those of the other transistors of the functional network in a configuration which provides the circuit with a predetermined logical function, and a ground switch transistor having its channel connected between the switch ground node and a V_{SS} supply terminal. The gate of the ground switch transistor receives a clock signal which turns that transistor OFF during a precharge phase of the clock signal and ON during an active phase of the clock signal. The gate of the precharge transistor is connected to a precharge generator providing a voltage signal which biases that transistor to have a relatively high channel conductance during the precharge phase and biases that transistor to have a relatively low channel conductance during the active phase. The bias applied to the gate of the precharge transistor is such that the channel conductance of that transistor is sufficient to permit replenishment of charge at the output terminal lost from undesired leakage but not so high as to significantly increase the power dissipation of the circuit. Thus, the disclosed circuit provides stable output states which are characteristic of a static circuit while also having low power dissipation, high performance and low transistor count which are characteristic of a dynamic circuit.

3 Claims, 1 Drawing Figure



4,280,065

THIS INVENTION IS AN IMPROVED TRI-STATE TYPE DRIVER. THE 3 STATES IN SUCH DRIVERS ARE "1", "0" AND "FLOAT." THE INVENTIVE DRIVER COMBINES TWO LOGIC CIRCUITS MADE UP OF CMOS CIRCUITS WITH AN OUTPUT INVERTER WHICH USES A BIPOLAR TRANSISTOR AS A LOAD AND A MOSFET AS A DRIVER. THIS COMBINATION, A GOOD EXAMPLE OF COMBINING LOGIC "FAMILIES", RESULTS IN IMPROVED DRIVING SPEED AND A REDUCTION IN CIRCUIT SIZE.

United States Patent [19]

Minato et al.

[11] **4,280,065**

[45] **Jul. 21, 1981**

[54] **TRI-STATE TYPE DRIVER CIRCUIT**

[75] Inventors: **Osamu Minato, Kokubunji; Toshiaki Masuhara, Hachioji; Toshio Sasaki, Hachioji; Masaharu Kubo, Hachioji, all of Japan**

[73] Assignee: **Hitachi, Ltd., Tokyo, Japan**

[21] Appl. No.: **969,269**

[22] Filed: **Dec. 14, 1978**

[30] **Foreign Application Priority Data**

Dec. 26, 1977 [JP] Japan 52-155570

[51] **Int. Cl.**[3] **H03K 3/01; H03K 19/08**

[52] **U.S. Cl.** **307/473; 307/448; 307/270; 307/454**

[58] **Field of Search** 307/209, 270, 264, 251, 307/279, 205, 214

[56] **References Cited**

U.S. PATENT DOCUMENTS

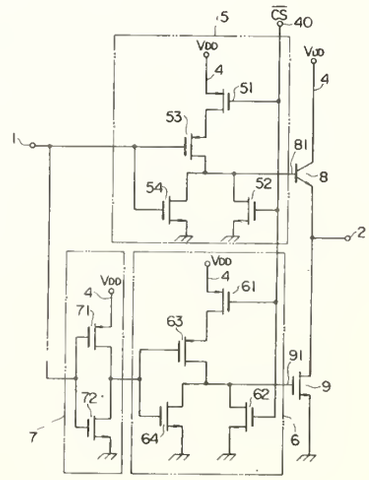
3,832,576	8/1974	Proebing	307/209
3,963,946	6/1976	Zajac	307/270
4,176,272	11/1979	Power	307/270

Primary Examiner—Stanley D. Miller, Jr.
Assistant Examiner—B. P. Davis
Attorney, Agent, or Firm—Craig and Antonelli

[57] **ABSTRACT**

This invention relates to a tri-state type driver circuit in which any one of the three possible output signals of "float", "on", or "off" is produced at high speed even when an output terminal is accompanied with a great load. The tri-state type driver circuit comprises an output inverter circuit which employs a bipolar transistor as a load thereof and a MOS-FET as a driver thereof, a first logical circuit which is coupled to an input terminal of the bipolar transistor, which first logical circuit is made up of a C-MOS circuit receiving an external select signal and a C-MOS circuit having an input signal transmitted thereto and whose output can be specified by the external select signal, and a second logical circuit which is coupled to an input terminal of the MOS-FET, which second logical circuit is made up of a C-MOS circuit receiving the external select signal and a C-MOS circuit having the input signal transmitted thereto.

13 Claims, 6 Drawing Figures



THIS INVENTION INVOLVES THE USE OF BOOLEAN LOGIC SWITCHING THEORY TO MINIMIZE THE LOGIC CIRCUITRY REQUIRED TO IMPLEMENT A DESIRED COMPLEX FUNCTION. THE SYMMETRIES OF THE COMPLEX FUNCTION ARE EXPLOITED TO ELIMINATE REDUNDANT VALUES OF EACH INPUT PAIR BY FILTERING THEM THROUGH A PRELIMINARY TRANSPOSITION GATE. THE FILTERING OF THESE REDUNDANCIES RESULTS IN A SUBSTANTIAL DECREASE IN REQUIRED LOGIC.

United States Patent [19]

Spillman

[11] **4,336,468**

[45] **Jun. 22, 1982**

[54] **SIMPLIFIED COMBINATIONAL LOGIC CIRCUITS AND METHOD OF DESIGNING SAME**

[75] Inventor: **Richard Spillman**, Davis, Calif.

[73] Assignee: **The Regents of the University of California**, Berkeley, Calif.

[21] Appl. No.: **94,450**

[22] Filed: **Nov. 15, 1979**

[51] **Int. Cl.**[3] **H03K 19/00**; H03K 19/20

[52] **U.S. Cl.** **307/440**; 307/465

[58] **Field of Search** 307/440, 445, 463, 465, 307/471

[56] **References Cited**

U.S. PATENT DOCUMENTS

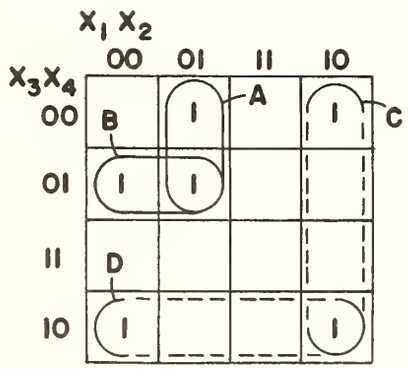
3,291,974	12/1966	Even	307/440
3,381,117	4/1968	Forslund et al.	307/465
3,579,119	5/1971	Yau et al.	307/465
3,700,868	10/1972	Silvertson, Jr.	307/465

Primary Examiner—John Zazworsky
Attorney, Agent, or Firm—Phillips, Moore, Lempio & Majestic

[57] **ABSTRACT**

A logic circuit and method for implementing a given, partially symmetric Boolean function $f(x_1 - x_n)$ which is pairwise symmetric with respect to at least one pair $x_i x_j$ of variables such that the function is invariant under their permutation. The circuit includes a symmetric logic array having a transposition gate for each pair $x_i x_j$, and a combinational logic circuit connected to the output of each transposition gate. The latter filters redundant values of each pair $x_i x_j$ and these values are used in the design of the combinational logic circuit. The invention simplifies or minimizes the gating for performing the function.

8 Claims, 12 Drawing Figures



DIGITAL LOGIC CIRCUITS

Reference Citation Information

During the examination of an application for a patent in the United States Patent and Trademark Office, references may be cited by the examiner and/or the applicant to indicate the prior art which is most closely related to the claimed invention. Other references may be cited merely to demonstrate the current state of the art. The information below is based on the references made of record during the examination of U.S. applications which were issued as patents in the subject technology during the period 1/1975-6/1982. A more detailed explanation appears in Appendix A.

TOTAL PATENTS ISSUED (1/1975-6/1982)	787
TOTAL REFERENCES CITED	4838
U.S. Patent References Cited	4095
Foreign Patent References Cited	107
Other References Cited	636

COUNTRY OF ORIGIN OF U.S. PATENT REFERENCES CITED*	NUMBER OF CITATIONS
United States	2912
Japan	460
West Germany	181
United Kingdom	95
Netherlands	60
France	52
Switzerland	45
Canada	34
Italy	10
Sweden	7

MOST FREQUENTLY CITED PATENTS	NUMBER OF CITATIONS
3,778,784	24
3,959,781	16
3,737,673	16
3,700,981	16

MOST FREQUENTLY CITED ASSIGNEES**	NUMBER OF CITATIONS
International Business Machines Corp.	451
RCA Corp.	265
Motorola	209
Rockwell International Corp.	170

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*"Country of Origin" information is limited to U.S. patent references issued from 1/1963-6/1982.

**Assignee information is limited to U.S. patent references issued from 1/1969-6/1982.

SEMICONDUCTOR MEMORIES

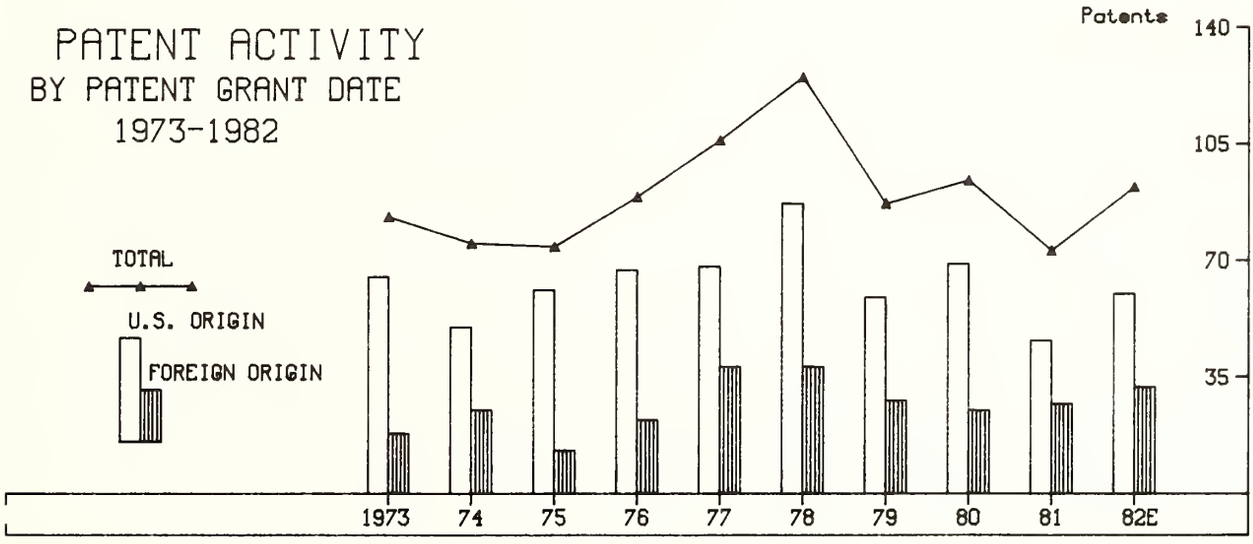
This profile includes apparatus for the static storage and retrieval of information. Static in this context means that there is no relative movement between the storage element and the source, receiver or transducer. Included apparatus are composed of individual, addressable storage elements which incorporate semiconductive materials.

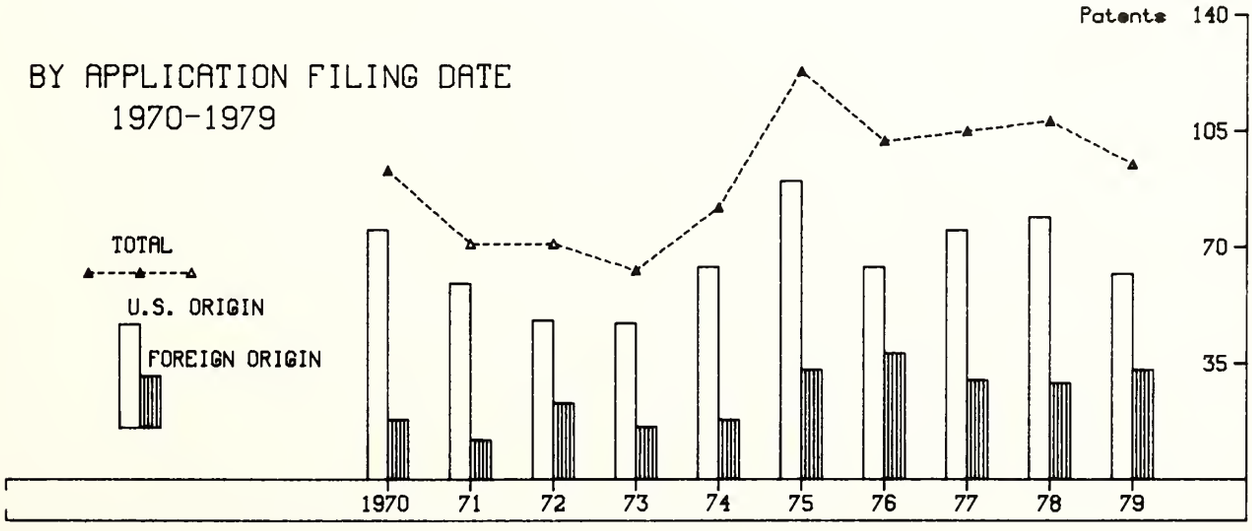
INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM

Class 365, Subclasses 103-105, 114, 115, 154-156, 163 and 174-188

ACTIVITY INDICES (1/1980-6/1982)

GROWTH	25.0%
FOREIGN SHARE	31.9%
CORPORATE OWNED	96.7%
GOVERNMENT OWNED	0.5%
U.S. OWNED OF FOREIGN	17.7%





SEMICONDUCTOR MEMORIES **PART 2A**

PATENT ACTIVITY (1/63- 6/82) BY DATE OF PATENT GRANT

	NUMBER OF PATENTS															
	63-68	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	TOTAL
TOTAL	149	43	63	76	113	83	75	74	89	106	125	87	94	73	46	1296
U.S. ORIGIN	130	35	50	66	96	65	50	61	67	68	87	59	69	46	30	979
FOREIGN ORIGIN	19	8	13	10	17	18	25	13	22	38	38	28	25	27	16	317
JAPAN	4	3	3	1	10	5	6	8	8	15	23	13	16	17	9	141
WEST GERMANY	3	1	3	2	2	5	7	3	8	12	10	13	3	5	6	83
UNITED KINGOOM	4	1	5	4	3	3	5	1	1	2	1		1		1	32
FRANCE	2		1	1		1	4	1	5	2	2	1	2	3		25
NETHERLANDS	3		1		2	1				4	2			1		14
SWITZERLAND	1					1	2			1			1			6
CANADA				2			1			1						4
U.S.S.R.		1				1							1			3
OENMARK		2														2
SWEDEN	1					1										2
ALGERIA	1															1
ISRAEL														1		1
ITALY													1			1
S. AFRICA										1						1
BURMA												1				1
U.S. ORIGIN	130	35	50	66	96	65	50	61	67	68	87	59	69	46	30	979
U.S. CORP. OWNED	121	35	47	62	91	63	50	56	63	63	79	53	67	45	27	922
U.S. GOVT. OWNED	7			1				4	3	1	3	4	1			24
U.S. INDIV. OWNED	2		3	3	4	2		1	1	4	4	2	1	1	3	31
FOREIGN OWNED					1						1					2
FOREIGN ORIGIN	19	8	13	10	17	18	25	13	22	38	38	28	25	27	16	317
U.S. OWNED	6		10	5	4	5	6	3	3	12	7	1	2	7	3	74
FOREIGN OWNED	13	8	3	5	13	13	19	10	19	26	31	27	23	20	13	243
FOREIGN CORP.	12	6	3	5	13	12	16	9	19	26	31	27	22	20	13	234
FOREIGN GOVT.																
FOREIGN INDIV.	1	2				1	3	1					1			9

SEMICONDUCTOR MEMORIES

PATENT ACTIVITY (PATENTS GRANTED 1/67- 6/82) BY DATE OF PATENT APPLICATION

	NUMBER OF PATENTED APPLICATIONS															
	PRE 69	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	TOTAL
TOTAL	187	67	93	71	71	63	82	123	102	105	108	95	36	1		1204
U.S. ORIGIN	154	60	75	59	48	47	64	90	64	75	79	62	20	1		898
FOREIGN ORIGIN	33	7	18	12	23	16	18	33	38	30	29	33	16			306
JAPAN	9		10	5	5	7	9	8	23	18	17	18	10			139
WEST GERMANY	7	2	2	3	7	3	6	13	11	7	10	5	6			82
UNITED KINGDOM	8	2	4	1	5	3		2	1			2				28
FRANCE	3	1		1	3	1	3	5		3	1	4				25
NETHERLANDS	2	1	1	1				4	1	1		1				12
SWITZERLAND				1	1	1		1				1				5
CANADA		1	1			1			1							4
U.S.S.R.	1				1						1					3
DENMARK	2															2
SWEDEN	1				1											2
ALGERIA																
ISRAEL												1				1
ITALY												1				1
S. AFRICA									1							1
BURMA										1						1
U.S. ORIGIN	154	60	75	59	48	47	64	90	64	75	79	62	20	1		898
U.S. CORP. OWNED	147	56	73	55	47	46	58	86	56	70	75	59	18	1		847
U.S. GOVT. OWNED	3	1		1			5	2	2	3	2	1				20
U.S. INDIV. OWNED	4	3	1	3	1	1	1	2	6	1	2	2	2			29
FOREIGN OWNED			1							1						2
FOREIGN ORIGIN	33	7	18	12	23	16	18	33	38	30	29	33	16			306
U.S. OWNED	14	5	4	3	7	2	2	12	6	4	1	8	3			71
FOREIGN OWNED	19	2	14	9	16	14	16	21	32	26	28	25	13			235
FOREIGN CORP.	17	2	14	9	13	12	16	21	32	26	27	25	13			227
FOREIGN GOVT.																
FOREIGN INDIV.	2				3	2					1					8

SEMICONDUCTOR MEMORIES

Organizational Patenting: Ranked

NO. OF PATENTS	ASSIGNEES WITH 5 OR MORE PATENTS (1/1969-6/1982)
194	INTERNATIONAL BUSINESS MACHINES CORP.
77	TEXAS INSTRUMENTS, INC.
65	RCA CORPORATION
65	BELL TELEPHONE LABORATORIES INC.
50	SIEMENS AKTIENGESELLSCHAFT
38	GENERAL ELECTRIC
37	MOTOROLA INC.
35	HITACHI, LTD.
32	WESTINGHOUSE ELECTRIC CORP.
30	SPERRY CORPORATION
30	TOKYO SHIBAURA ELECTRIC CO., LTD.
28	NIPPON ELECTRIC CO., LTD.
25	FAIRCHILD CAMERA AND INSTRUMENT CORP.
23	BURROUGHS CORP.
23	U.S. PHILIPS CORP.
21	INTEL CORP.
21	NCR CORPORATION
16	ROCKWELL INTERNATIONAL CORP.
14	FUJITSU LTD.
13	HONEYWELL INFORMATION SYSTEMS INC.
12	XEROX CORP.
11	HARRIS CORP.
10	GENERAL INSTRUMENT CORP.
10	MASSACHUSETTS INSTITUTE OF TECHNOLOGY
8	ENERGY CONVERSION DEVICES, INC.
8	HONEYWELL INC.
8	HUGHES AIRCRAFT CO.
8	MOSTEK CORP.
8	THOMSON-CSF
8	UNITED STATES OF AMERICA, ARMY
7	COGAR CORP.
7	MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.
6	HEWLETT-PACKARD CO.
6	SIGNETICS CORP.
5*	AMERICAN MICRO-SYSTEMS INC.
5	INTERSIL, INC.
5	NATIONAL SEMICONDUCTOR CORP.
5	SHELL OIL CO.
5	SONY CORP.
5	UNITED STATES OF AMERICA, AIR FORCE

*Composite Total. See Appendix A.

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

ACTRON INDUSTRIES, INC.
3959784 - HIGH SPEED OPTICAL READ-OUT OF DATA STORED IN AN ARRAY

ADVANCED MEMORY SYSTEMS INC.
3795898 - RANDOM ACCESS READ/WRITE SEMICONDUCTOR MEMORY

ADVANCED MICRO DEVICES, INC.
4272811 - WRITE AND READ CONTROL CIRCUIT FOR SEMICONDUCTOR MEMORIES

AGENCE NATIONALE DE VALORISATION DE LA RECHERCHE (ANVAR)
3860916 - OPTICAL INFORMATION STORAGE DEVICE
3950738 - SEMI-CONDUCTOR NON-VOLATILE OPTICAL MEMORY DEVICE

AMERICAN MICRO-SYSTEMS, INC.
4003036 - SINGLE IGFET MEMORY CELL WITH BURIED STORAGE ELEMENT
4105475 - EPITAXIAL METHOD OF FABRICATING SINGLE IGFET MEMORY CELL WITH BURIED STORAGE ELEMENT
4214312 - VMOS FIELD ALIGNED DYNAMIC RAM CELL
4222062 - VMOS FLOATING GATE MEMORY DEVICE

AMERICAN MICROSYSTEMS
4222063 - VMOS FLOATING GATE MEMORY WITH BREAKDOWN VOLTAGE LOWERING REGION

AUTOMATIC ELECTRIC LABORATORIES INC.
3445824 - INFORMATION STORAGE MATRIX UTILIZING ELECTRET

BELL TELEPHONE LABORATORIES INCORPORATED
3500142 - FIELD EFFECT SEMICONDUCTOR APPARATUS WITH MEMORY INVOLVING ENTRAPMENT OF CHARGE CARRIERS
3505527 - ELECTRONIC DRIVE CIRCUIT EMPLOYING SUCCESSIVELY ENABLED MULTISTATE IMPEDANCE ELEMENTS
3508210 - MEMORY ELEMENT USING TWO-VALLEY SEMICONDUCTOR
3518634 - OPTICAL MEMORY WITH PHOTOACTIVE MEMORY ELEMENT
3523190 - MOS PHOTODETECTOR HAVING DUAL GATE ELECTRODES
3540007 - FIELD EFFECT TRANSISTOR MEMORY CELL
3540009 - CONTROLLED SWITCH STORE FOR EXTENDING SAMPLING TIME INTERVALS
3540010 - DIODE-COUPLED
3541531 - SEMICONDUCTIVE MEMORY ARRAY WHEREIN OPERATING POWER IS SUPPLIED VIA INFORMATION PATHS
3543052 - DEVICE EMPLOYING IGFET IN COMBINATION WITH SCHOTTKY DIODE
3553541 - BILATERAL SWITCH USING COMBINATION OF FIELD EFFECT TRANSISTORS AND BIPOLAR TRANSISTORS
3573499 - BIPOLAR MEMORY USING STORED CHARGE
3585412 - SCHOTTKY BARRIER DIODES AS IMPEDANCE ELEMENTS
3609710 - ASSOCIATIVE MEMORY CELL WITH INTERROGATION ON NORMAL DIGIT CIRCUITS
3611317 - NESTED CHIP ARRANGEMNT FOR INTEGRATED CIRCUIT MEMORIES
3611318 - SEMICONDUCTOR STORAGE APPARATUS
3626389 - CROSSPOINT MATRIX MEMORY USING STORED CHARGE
3633182 - CONTENT ADDRESSABLE MEMORY CELL
3638202 - ACCESS CIRCUIT ARRANGEMENT FOR EQUALIZED LOADING IN INTEGRATED CIRCUIT ARRAYS
3643230 - SERIAL STORAGE AND TRANSFER APPARATUS EMPLOYING CHARGE STORAGE DIODES IN INTERSTAGE COUPLING CIRCUITRY
3654497 - SEMICONDUCTOR LASERS UTILIZING INTERNAL SATURABLE ABSORBERS
3654499 - CHARGE COUPLE MEMORY WITH STORAGE SITES
3660697 - MONOLITHIC SEMICONDUCTOR APPARATUS ADAPTED FOR SEQUENTIAL CHARGE TRANSFER
3676715 - SEMICONDUCTOR APPARATUS FOR IMAGE SENSING AND DYNAMIC STORAGE
3676867 - USE OF MNALGE IN MAGNETIC STORAGE DEVICES
3686645 - CHARGE STORAGE FLIP-FLOP
3693173 - TWO-TERMINAL DUAL PNP TRANSISTOR SEMICONDUCTOR MEMORY
3699540 - TWO-TERMINAL TRANSISTOR MEMORY UTILIZING COLLECTOR-BASE AVALANCHE BREAKDOWN
3699541 - TWO-TERMINAL TRANSISTOR MEMORY UTILIZING EMITTER-BASE AVALANCHE BREAKDOWN
3699542 - TWO-TERMINAL TRANSISTOR MEMORY UTILIZING SATURATION OPERATION

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

BELL TELEPHONE LABORATORIES INCORPORATEO (CONTINUEO)

3700932 - CHARGE COUPLEO OEVICES
3701119 - CONTROL CIRCUITRY ANO VOLTAGE SOURCE FOR USE WITH CHARGE STORAGE OIOOE
3715732 - TWO-TERMINAL NPN-PNP TRANSISTOR MEMORY CELL
3731164 - COMBINEO BIPOLAR ANO FIELO EFFECT TRANSISTORS
3753248 - TWO-TERMINAL NONOESTRUCTIVE REAO JFET-NPN TRANSISTOR SEMICONOUCTOR MEMORY
3761744 - SEMICONOUCTOR CHARGE TRANSFER OEVICES
3786443 - NONOESTRUCTIVE REAO SEMICONOUCTOR MEMORY UTILIZING AVALANCHE BREAKOOWN
3806896 - REOUCEO ACCESS TERMINAL MEMORY SYSTEM
3810130 - ONE-PORT COMPLEMENTARY MEMORY CELL
3831041 - COMPENSATING CIRCUIT FOR SEMICONOUCTIVE APPARATUS
3849675 - LOW POWER FLIP-FLOP CIRCUITS
3858232 - INFORMATION STORAGE OEVICES
3859642 - RANOOM ACCESS MEMORY ARRAY OF HYSTERESIS LOOP CAPACITORS
3876991 - OUAL THRESHOLO, THREE TRANSISTOR OYNAMIC MEMORY CELL
3899694 - COMPENSATING REFERENCE VOLTAGE CIRCUIT FOR SEMICONOUCTOR APPARATUS
3909807 - INTEGRATED CIRCUIT MEMORY CELL
3967136 - INPUT CIRCUIT FOR SEMICONOUCTOR CHARGE TRANSFER OEVICE CIRCULATING MEMORY APPARATUS
4030083 - SELF-REFRESHEO CAPACITOR MEMORY CELL
4085456 - CHARGE TRANSFER IMAGING OEVICES
4099260 - BIPOLAR REAO-ONLY-MEMORY UNIT HAVING SELF-ISOLATING BIT-LINES
4110841 - LEVEL SHIFTER ANO SENSE REFRESH OETECTOR
4139907 - INTEGRATEO REAO ONLY MEMORY
4188671 - SWITCHEO-CAPACITOR MEMORY
4192015 - OPTICAL IMAGE SENSOR SEMICONOUCTOR APPARATUS
4208728 - PROGRAMABLE LOGIC ARRAY
4238694 - HEALING RAOIATION OEFECTS IN SEMICONOUCTORS

BUNKER RAMO CORPORATION

3438015 - CONTENT AOORESSABLE MEMORIES
3447137 - OIGITAL MEMORY APPARATUS
3518635 - OIGITAL MEMORY APPARATUS

BURROUGHS CORPORATION

3491342 - SEMICONOUCTIVE ASSOCIATIVE MEMORY SYSTEM
3506971 - APPARATUS FOR ELECTROSTATICALLY STORING SIGNAL REPRESENTATIONS
3614749 - INFORMATION STORAGE OEVICE
3942163 - CCO STACK MEMORY ORGANIZATION
3975717 - CHARGE COUPLEO OEVICE STACK MEMORY ORGANIZATION ANO REFRESH METHOO
4011548 - THREE PHASE CHARGE-COUPLEO OEVICE MEMORY WITH INHIBIT LINES
4021788 - CAPACITOR MEMORY CELL
4025907 - INTERLACEO MEMORY MATRIX ARRAY HAVING SINGLE TRANSISTOR CELLS
4031522 - ULTRA HIGH SENSITIVITY SENSE AMPLIFIER FOR MEMORIES EMPLOYING SINGLE TRANSISTOR CELLS
4032765 - MEMORY MOOIFICATION SYSTEM
4065756 - ASSOCIATIVE MEMORY WITH NEIGHBORING RECIRCULATEO PATHS OFFSET BY ONE BIT
4084154 - CHARGE COUPLEO OEVICE MEMORY SYSTEM WITH BURST MOOE
4112504 - FAST ACCESS CHARGE COUPLEO OEVICE MEMORY ORGANIZATIONS FOR A SEMICONOUCTOR CHIP
4115872 - AMORPHOUS SEMICONOUCTOR MEMORY OEVICE FOR EMPLOYMENT IN AN ELECTRICALLY ALTERABLE REAO-ONLY MEMORY
4116720 - METHOO OF MAKING A V-MOS FIELO EFFECT TRANSISTOR FOR A OYNAMIC MEMORY CELL HAVING IMPROVEO CAPACITANCE
4141027 - IGFET INTEGRATEO CIRCUIT MEMORY CELL
4153949 - ELECTRICALLY PROGRAMMABLE REAO-ONLY-MEMORY OEVICE
4156287 - FAST ACCESS CHARGE COUPLEO OEVICE MEMORY ORGANIZATIONS FOR A SEMICONOUCTOR CHIP
4177475 - HIGH TEMPERATURE AMORPHOUS MEMORY OEVICE FOR AN ELECTRICALLY ALTERABLE REAO-ONLY MEMORY
4180866 - SINGLE TRANSISTOR MEMORY CELL EMPLOYING AN AMORPHOUS SEMICONOUCTOR THRESHOLO OEVICE
4203123 - THIN FILM MEMORY OEVICE EMPLOYING AMORPHOUS SEMICONOUCTOR MATERIALS
4215423 - FAST ACCESS CHARGE COUPLEO OEVICE MEMORY ORGANIZATIONS FOR A SEMICONOUCTOR CHIP

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

BURROUGHS CORPORATION (CONTINUED)
4321694 - CHARGE COUPLED DEVICE MEMORY WITH ENHANCED ACCESS FEATURES

CANON KABUSHIKI KAISHA
4006470 - READ-ONLY MEMORY

CENTRE ELECTRONIQUE HORLOGER, S.A.
4228527 - ELECTRICALLY REPROGRAMMABLE NON VOLATILE MEMORY

CHRYSLER CORPORATION
4128900 - PROGRAMMABLE READ ONLY MEMORY FOR ELECTRONIC ENGINE CONTROL

COGAR CORPORATION
3576549 - SEMICONDUCTOR DEVICE, METHOD AND MEMORY ARRAY
3618046 - BI-LEVEL SEMICONDUCTOR MEMORY CIRCUIT WITH HIGH SPEED WORD DRIVER
3618052 - BISTABLE MEMORY WITH PREDETERMINED TURN-ON STATE
3656118 - READ/WRITE SYSTEM AND CIRCUIT FOR SEMICONDUCTOR MEMORIES
3685027 - DYNAMIC MOS MEMORY ARRAY CHIP
3760384 - FET MEMORY CHIP INCLUDING FET DEVICES THEREFOR AND FABRICATION METHOD
3786442 - RAPID RECOVERY CIRCUIT FOR CAPACITIVELY LOADED BIT LINES

COMMISSARIAT A L'ENERGIE ATOMIQUE
3739353 - OPTICAL-ACCESS MEMORY DEVICE FOR NON-DESTRUCTIVE READING
4054864 - METHOD AND DEVICE FOR THE STORAGE OF ANALOG SIGNALS

COMPAGNIE GENERALE D'ELECTRICITE
3594737 - TUNNEL DIODE MEMORY-POINTS MATRIX FOR READING- WRITING, DEVICE AND METHOD OF PRODUCING

COMPAGNIE INTERNATIONALE POUR L'INFORMATIQUE CII-HONEYWELL
3806894 - BINARY DATA INFORMATION STORES
3909805 - PROGRAMMABLE READ ONLY MEMORY
3959783 - CONTROL STORE UNIT ADDRESSING DEVICE

CORNING GLASS WORKS
3631407 - CHARACTER MEMORY OF REDUCED SIZE

CSELT - CENTRO STUDI E LABORATORI TELECOMUNICAZIONI S.P.A.
4216532 - SELF-CORRECTING SOLID-STATE MASS MEMORY ORGANIZED BY WORDS FOR A STORED-PROGRAM CONTROL SYSTEM

DANFOSS A/S
3445823 - MEMORY HAVING A MULTI-VALVED IMPEDANCE ELEMENT
3469154 - BISTABLE SEMICONDUCTOR SWITCHING DEVICE

EASTMAN KODAK COMPANY
4330753 - METHOD AND APPARATUS FOR RECOVERING A SIGNAL FROM A CHARGE TRANSFER DEVICE

E. I. DU PONT DE NEMOURS AND COMPANY
3864715 - DIODE ARRAY-FORMING ELECTRICAL ELEMENT
3990098 - STRUCTURE CAPABLE OF FORMING A DIODE AND ASSOCIATED CONDUCTIVE PATH

ELECTRONIC ARRAYS, INC.
4181980 - ACQUISITION AND STORAGE OF ANALOG SIGNALS

ELECTRONIC MEMORIES + MAGNETICS CORPORATION
4134151 - SINGLE SENSE LINE MEMORY CELL
4161791 - AUTOMATIC REFRESH MEMORY CELL

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

ELECTRONICS ARRAYS, INC.
- 3665422 - INTEGRATED CIRCUIT, RANDOM ACCESS MEMORY
- 3704454 - ACCESSION SYSTEM FOR AND IN INTEGRATED CIRCUIT TYPE MEMORIES
- 3878404 - INTEGRATED CIRCUIT OF THE MOS VARIETY

ELECTRONICS ASSOCIATES, INC.
- 3483530 - DISCRETE BISTABLE DITITAL MEMORY SYSTEM

ENERGY CONVERSION DEVICES, INC.
- 3571809 - MEMORY MATRIX HAVING SERIALLY CONNECTED THRESHOLD AND MEMORY SWITCH DEVICES AT EACH CROSS-OVER POINT
- 3573757 - MEMORY MATRIX HAVING SERIALLY CONNECTED THRESHOLD AND MEMORY SWITCH DEVICES AT EACH CROSS-OVER POINT
- 3629863 - FILM DEPOSITED CIRCUITS AND DEVICES THEREFOR
- 3696344 - OPTICAL MASS MEMORY EMPLOYING AMORPHOUS THIN FILMS
- 3699543 - COMBINATION FILM DEPOSITED SWITCH UNIT AND INTEGRATED CIRCUITS
- 3846767 - METHOD AND MEANS FOR RESETTING FILAMENT-FORMING MEMORY SEMICONDUCTOR DEVICE
- 3875566 - RESETTING FILAMENT-FORMING MEMORY SEMICONDUCTOR DEVICES WITH MULTIPLE RESET PULSES
- 3922648 - METHOD AND MEANS FOR PREVENTING DEGRADATION OF THRESHOLD VOLTAGE OF FILAMENT-FORMING MEMORY SEMICONDUCTOR DEVICE

ETUDES ET BONNETERIE S.A.
- 3818724 - DATA PROGRAMMING DEVICE, PARTICULARLY FOR CONTROL OF KNITTING MACHINES

FAIRCHILD CAMERA AND INSTRUMENT CORPORATION
- 3427598 - EMITTER GATED MEMORY CELL
- 3428875 - VARIABLE THRESHOLD INSULATED GATE FIELD EFFECT DEVICE
- 3465293 - DETECTOR ARRAY CONTROLLING MOS TRANSISTOR MATRIX
- 3488636 - OPTICALLY PROGRAMMABLE READ ONLY MEMORY
- 3530443 - MOS GATED RESISTOR MEMORY CELL
- 3562721 - SOLID STATE SWITCHING AND MEMORY APPARATUS
- 3641512 - INTEGRATED MNOS MEMORY ORGANIZATION
- 3772660 - SOLID STATE SWITCHING AND MEMORY APPARATUS
- 3891977 - CHARGE COUPLED MEMORY DEVICE
- 3898483 - BIPOLAR MEMORY CIRCUIT
- 3949243 - BIPOLAR MEMORY CIRCUIT
- 3983412 - DIFFERENTIAL SENSE AMPLIFIER
- 4021786 - MEMORY CELL CIRCUIT AND SEMICONDUCTOR STRUCTURE THEREFORE
- 4024512 - LINE-ADDRESSABLE RANDOM-ACCESS MEMORY
- 4032902 - AN IMPROVED SEMICONDUCTOR MEMORY CELL CIRCUIT AND STRUCTURE
- 4035784 - ASYMMETRICAL MEMORY CELL ARRANGEMENT
- 4104734 - LOW VOLTAGE DATA RETENTION BIAS CIRCUITRY FOR VOLATILE MEMORIES
- 4138739 - SCHOTTKY BIPOLAR TWO-PORT RANDOM-ACCESS MEMORY
- 4139787 - LINE-ADDRESSABLE RANDOM-ACCESS MEMORY DECOUPLING APPARATUS
- 4165541 - SERIAL-PARALLEL-SERIAL CHARGE-COUPLED DEVICE MEMORY HAVING INTERLACING AND RIPPLE CLOCKING OF THE PARALLEL SHIFT REGISTERS
- 4172291 - PRESET CIRCUIT FOR INFORMATION STORAGE DEVICES
- 4173791 - INSULATED GATE FIELD-EFFECT TRANSISTOR READ-ONLY MEMORY ARRAY
- 4268911 - ROM PROGRAM SECURITY CIRCUITS
- 4276616 - MERGED BIPOLAR/FIELD-EFFECT BISTABLE MEMORY CELL
- 4334157 - DATA LATCH WITH ENABLE SIGNAL GATING

FERRANTI LIMITED
- 3818463 - SEMICONDUCTOR INFORMATION STORAGE DEVICES
- 3827034 - SEMICONDUCTOR INFORMATION STORAGE DEVICES

FUJITSU LIMITED
- 3441750 - SELECTIVE CONTROL OF BISTABLE CIRCUIT WITH DIFFERENTIATED PULSES
- 4060796 - SEMICONDUCTOR MEMORY DEVICE

ORGANIZATIDNAL PATENTING (1/69- 6/82) - - ALPHA LISTING

FUJITSU LIMITED (CDNTINUED)

4156939 - INTEGRATED SEMICONDUCTOR MEMDRY DEVICE
4185320 - DECDDER CIRCUIT
4231109 - SEMICDNDUCTOR INTEGRATED CIRCUIT DEVICE
4247863 - SEMICDNDUCTOR MEMORY DEVICE
4250569 - SEMICDNDUCTOR MEMORY DEVICE
4262340 - SEMICDNDUCTOR MEMORY DEVICE
4287569 - SEMICDNDUCTOR MEMDRY DEVICE
4291394 - SEMICDNDUCTOR MEMORY DEVICE HAVING FLIP-FLOP CIRCUITS
4309762 - SEMICDNDUCTOR MEMORY APPARATUS
4322820 - SEMICDNDUCTOR INTEGRATED CIRCUIT DEVICE
4330849 - COMPLEMENTARY SEMICONDUCTOR MEMDRY DEVICE
4333164 - READ DNLY MEMORY

GENERAL ELECTRIC CDMPANY

3421026 - MEMDRY FLIP-FLOP
3480843 - THIN-FILM STORAGE DIODE WITH TELLURIUM COUNTERELECTRODE
3483529 - LASER LOGIC AND STORAGE ELEMENT
3540005 - DIODE COUPLED READ AND WRITE CIRCUITS FDR FLIP-FLOP MEMDRY
3550100 - INFORMATION STDRAGE CONTROL APPARATUS FOR A MAGNETIC CORE MEMORY
3623026 - MIS DEVICE AND METHDD FDR STORING INFORMATION AND PRDVIDING AN OPTICAL READDUT
3641510 - BEAM ADDRESSABLE MASS STORAGE USING THIN FILM WITH BISTABLE ELECTRICAL CONDUCTIVITY
3662356 - INTEGRATED CIRCUIT BISTABLE MEMORY CELL USING CHARGE-PUMPED DEVICES
3689900 - PHDTD-CODED DIDDE ARRAY FDR READ ONLY MEMDRY
3691537 - HIGH SPEED SIGNAL IN MOS CIRCUITS BY VOLTAGE VARIABLE CAPACITDR
3698078 - DIODE ARRAY STDRAGE SYSTEM HAVING A SELF-REGISTERED TARGET AND METHDD OF FDRMING
3699544 - THREE TRANSISTOR MEMDRY CELL
3701980 - HIGH DENSITY FOUR-TRANSISTOR MDS CDNTENT ADDRESSED MEMDRY
3750115 - READ MDSTLY ASSDCIATIVE MEMORY CELL FOR UNIVERSAL LDGIC
3761895 - METHOD AND APPARATUS FOR STORING AND READING OUT CHARGE IN AN INSULATING LAYER
3763476 - METHDD AND APPARATUS FOR STORING AND READING OUT CHARGE IN AN INSULATING LAYER
3781827 - DEVICE FOR STORING INFDRMATION AND PROVIDING AN ELECTRIC READOUT
3781831 - READ ONLY MEMDRY UTILIZING FLOATING GATE TRANSISTDRS AND METHDD OF PRDGRAMMING
3786441 - METHDD AND DEVICE FDR STDRING INFDRMATION AND PROVIDING AN ELECTRIC READOUT
3800297 - NDN-VOLATILE ASSDCIATIVE MEMDRY
3801820 - METHOD AND APPARATUS FOR SENSING RADIATION AND PRDVIDING ELECTRICAL READOUT
3882531 - APPARATUS FDR SENSING RADIATION AND PROVIDING ELECTRICAL READ OUT
3916268 - DEVICE FOR STDRING INFORMATION AND PRDVIDING AN ELECTRIC READOUT FROM A CONDUCTOR-INSULATDR-SEMICONDUCTOR STRUCTURE
3916392 - THIN-FILM SEMICDNDUCTDR MEMDRY APPARATUS
4011441 - SOLID STATE IMAGING APPARATUS
4011442 - APPARATUS FOR SENSING OPTICAL SIGNALS
4064495 - ION IMPLANTED ARCHIVAL MEMDRY MEDIA AND METHDDS FOR STDRAGE OF DATA THEREIN
4081794 - ALLOY JUNCTION ARCHIVAL MEMORY PLANE AND METHDDS FDR WRITING DATA THEREDN
4084257 - SIGNAL PROCESSING APPARATUS
4099261 - METHDD FOR WRITING ON ARCHIVAL MEMDRY TARGET BY IDN DAMAGE
4103343 - CHARGE TRANSFER APPARATUS
4125785 - CHARGE TRANSFER MEMDRY APPARATUS
4128897 - ARCHIVAL MEMORY MEDIA AND METHOD FOR INFORMATION RECORDING THEREON
4130891 - METHDDS OF GRAY SCALE RECDRDING AND ARCHIVAL MEMDRY TARGET PRODUCED THEREBY
4165537 - ANALOG CHARGE TRANSFER APPARATUS
4185318 - CHARGE STORAGE MEMORY WITH ISOLATION NDDAL FOR EACH BIT LINE
4241421 - SDLID STATE IMAGING APPARATUS
4287572 - METHDD FOR WRITING ON ARCHIVAL TARGET AND TARGET PRODUCED THEREBY

GENERAL INSTRUMENT CORPORATION

3599180 - RANDOM ACCESS READ-WRITE MEMDRY SYSTEM HAVING DATA REFRESHING CAPABILITIES AND MEMORY CELL THEREFDR

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

GENERAL INSTRUMENT CORPORATION (CONTINUED)
3611437 - READ-ONLY MEMORY WITH OPERATIVE AND INOPERATIVE DATA DEVICES LOCATED AT ADDRESS STATIONS AND WITH MEANS FOR CONTROLLABLY CHARGING AND DISCHARGING APPROPRIATE MODES OF THE ADDRESS STATIONS
3644904 - CHIP SELECT CIRCUIT FOR MULTI-CHIP RANDOM ACCESS MEMORY
3656119 - MEMORY UTILIZING THE NON-LINEAR INPUT CAPACITANCE OF AN MOS DEVICE
3691534 - READ ONLY MEMORY SYSTEM HAVING INCREASED DATA RATE WITH ALTERNATE DATA READOUT
3870901 - METHOD AND APPARATUS FOR MAINTAINING THE CHARGE ON A STORAGE NODE OF A MOS CIRCUIT
3882472 - DATA FLOW CONTROL IN MEMORY HAVING TWO DEVICE MEMORY CELLS
3893087 - RANDOM ACCESS MEMORY WITH SHARED COLUMN CONDUCTORS
4193126 - I+HU 2+B L RAM UNIT
4297598 - I\2/ L SENSING CIRCUIT WITH INCREASED SENSITIVITY

GENERAL MOTORS CORPORATION
3631410 - EVENT RECORDER
4295209 - PROGRAMMING AN IGFET READ-ONLY-MEMORY

GTE AUTOMATIC ELECTRIC LABORATORIES INCORPORATED
3713110 - MECHANICALLY ALTERABLE DIODE MATRIX MEMORY
3750114 - CHARGE COUPLED ELECTRONIC LINE SCANNER

GTE LABORATORIES INCORPORATED
4151537 - GATE ELECTRODE FOR MNOS SEMICONDUCTOR MEMORY DEVICE
4168539 - MEMORY SYSTEM WITH ROW CLAMPING ARRANGEMENT

GTE SYLVANIA INCORPORATED
3473149 - MEMORY DRIVE CIRCUITRY

HARRIS CORPORATION
4122547 - COMPLEMENTARY FET DRIVERS FOR PROGRAMMABLE MEMORIES
4149268 - DUAL FUNCTION MEMORY
4174521 - PROM ELECTRICALLY WRITTEN BY SOLID PHASE EPITAXY
4199692 - AMORPHOUS NON-VOLATILE RAM
4204275 - UNISOLATED EAROM MEMORY ARRAY
4225946 - MULTILEVEL ERASE PULSE FOR AMORPHOUS MEMORY DEVICES
4228524 - MULTILEVEL SEQUENCE OF ERASE PULSES FOR AMORPHOUS MEMORY DEVICES
4236231 - PROGRAMMABLE THRESHOLD SWITCHABLE RESISTIVE MEMORY CELL ARRAY
4272833 - TWO SWITCHABLE RESISTIVE ELEMENT PER CELL MEMORY ARRAY
4292730 - METHOD OF FABRICATING MESA BIPOLAR MEMORY CELL UTILIZING EPITAXIAL DEPOSITION, SUBSTRATE REMOVAL AND SPECIAL METALLIZATION
4312046 - VERTICAL FUSE AND METHOD OF FABRICATION

HARRIS SEMICONDUCTOR
4192016 - CMOS-BIPOLAR EAROM

HAYAKAWA DENKI KOGYO KABUSHIKI KAISHA
3483400 - FLIP-FLOP CIRCUIT

HEIMANN GMBH
4020474 - MANIPULATABLE READ-OUT MEMORY

HEWLETT-PACKARD COMPANY
3701123 - HYBRID INTEGRATED CIRCUIT MODULE
3721964 - INTEGRATED CIRCUIT READ ONLY MEMORY BIT ORGANIZED IN COINCIDENT SELECT STRUCTURE
4000504 - DEEP CHANNEL MOS TRANSISTOR
4142251 - FIELD PROGRAMMABLE READ-ONLY-MEMORY
4163243 - ONE-TRANSISTOR MEMORY CELL WITH ENHANCED CAPACITANCE

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

HEWLETT-PACKARD COMPANY (CONTINUED)
- 4198694 - X-Y ADDRESSABLE MEMORY

HITACHI, LTD.
- 3703710 - SEMICONDUCTOR MEMORY
- 3745540 - SEMICONDUCTOR MEMORY
- 3801966 - OPTICAL MEMORY DEVICE
- 3813563 - FLIP-FLOP CIRCUIT
- 3818252 - UNIVERSAL LOGICAL INTEGRATED CIRCUIT
- 3821719 - SEMICONDUCTOR MEMORY
- 3868654 - MEMORY CELL WITH HIGH THRESHOLO WRITING TRANSISTOR
- 3876988 - ASSOCIATIVE MEMORY
- 3980899 - WORD LINE DRIVER CIRCUIT IN MEMORY CIRCUIT
- 4031413 - MEMORY CIRCUIT
- 4040015 - COMPLEMENTARY MOS LOGIC CIRCUIT
- 4044340 - SEMICONDUCTOR MEMORY
- 4063118 - MIS DECODER PROVIOING NON-FLOATING OUTPUTS WITH SHORT ACCESS TIME
- 4066915 - MEMORY CIRCUIT
- 4069427 - MIS LOGIC CIRCUIT OF RATIOLESS TYPE
- 4070654 - BIPOLAR READ-ONLY MEMORY
- 4074238 - SEMICONDUCTOR READ-ONLY MEMORY
- 4084105 - LSI LAYOUT ANO METHOO FOR FABRICATION OF THE SAME
- 4089022 - ELECTRON OEVICE
- 4104733 - AOORESS SELECTING CIRCUITRY FOR SEMICONDUCTOR MEMORY OEVICE
- 4107548 - RATIOLESS TYPE MIS LOGIC CIRCUIT
- 4112508 - SEMICONDUCTOR MEMORY
- 4145701 - SEMICONDUCTOR DEVICE
- 4151607 - SEMICONDUCTOR MEMORY OEVICE
- 4156941 - HIGH SPEED SEMICONDUCTOR MEMORY
- 4164791 - SEMICONDUCTOR MEMORY WITH EQUAL WORD LINE ANO REFERENCE LINE VOLTAGE OROP
- 4183093 - SEMICONDUCTOR INTEGRATED CIRCUIT OEVICE COMPOSED OF INSULATEO GATE FIELO-EFFECT TRANSISTOR
- 4240151 - SEMICONDUCTOR READ ONLY MEMORY
- 4264965 - DUMMY CELL STRUCTURE FOR MIS OYNAMIC MEMORIES
- 4272834 - DATA LINE POTENTIAL SETTING CIRCUIT AND MIS MEMORY CIRCUIT USING THE SAME
- 4290119 - MEMORY DEVICE PROTECTED AGAINST UNDESIRABLE SUPPLY VOLTAGE LEVEL
- 4298961 - BIPOLAR MEMORY CIRCUIT
- 4308596 - MEMORY ORIVING METHOD
- 4314359 - SEMICONDUCTOR MEMORY DEVICE
- 4316265 - MEMORY OEVICE WITH HIGH SPEED MEMORY CELL SELECTION MECHANISM

HONEYWELL INC.
- 3475735 - SEMICONDUCTOR MEMORY
- 3487376 - PLURAL EMITTER SEMICONDUCTIVE STORAGE OEVICE
- 3624620 - MEMORY AODRESS SELECTION CIRCUITRY
- 3742465 - ELECTRONIC MEMORY STORAGE ELEMENT
- 3829846 - MULTI-FUNCTION LOGIC MODULE EMPLOYING REAO-ONLY ASSOCIATIVE MEMORY ARRAYS
- 3968480 - MEMORY CELL
- 4051464 - SEMICONDUCTOR MEMORY CELL
- 4319343 - PROGRAMMABLE OIGITAL MEMORY CIRCUIT

HONEYWELL INFORMATION SYSTEMS INC.
- 3703711 - MEMORY CELL WITH VOLTAGE LIMITING AT TRANSISTOR CONTROL TERMINALS
- 3747076 - MEMORY WRITE CIRCUIT
- 3765000 - MEMORY STORAGE CELL WITH SINGLE SELECTION LINE ANO SINGLE INPUT/OUTPUT LINE
- 3774171 - READ ONLY MEMORY ORGANIZATION
- 3900837 - VARIABLY ADDRESSABLE SEMICONDUCTOR MASS MEMORY

DRGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

HDNEYWELL INFDRMATION SYSTEMS INC. (CDNTINUED)

3916394 - HIGH-SPEED RANDDM ACCESS MEMDRY
3986179 - FAULT-TDLERANT CCD MEMDRY CHIP
4007446 - MULTIPHASE SERIES-PARALLEL-SERIES CHARGE-CDUPLED DEVICE REGISTERS
4024509 - CCD REGISTER ARRAY ADDRESSING SYSTEM INCLUDING APPARATUS FDR BY-PASSING SELECTED ARRAYS
4024514 - MULTIPHASE SERIES-PARALLEL-SERIES CHARGE-CDUPLED DEVICE REGISTERS WITH SIMPLIFIED INPUT CLDCKING
4030084 - SUBSTRATE BIAS VDLTAGE GENERATED FRDM REFRESH DSCILLATDR
4048626 - MEMDRY DEVICE
4070657 - CURRENT MDDE SIMULTANEDUS DUAL-READ/SINGLE-WRITE MEMDRY DEVICE

HUGHES AIRCRAFT CDMPANY

3577210 - SDLID-STATE STORAGE DEVICE
3824593 - MILLIMETER WAVE IMAGING SYSTEM USING DIRECT CARRIER INJECTIDN
3913077 - SERIAL-PARALLEL-SERIAL CCD MEMDRY WITH INTERLACED STDRAGE
4128773 - VDLATILE/NDN-VDLATILE LDGIC LATCH CIRCUIT
4132904 - VDLATILE/NDN-VDLATILE LDGIC LATCH CIRCUIT
4175290 - INTEGRATED SEMICDNDUCTDR MEMDRY ARRAY HAVING IMPRDVED LDGIC LATCH CIRCUITRY
4306160 - CHARGE CDUPLED DEVICE STAIRCASE ELECTRDDE MULTIPLEXER
4333166 - SEMICDNDUCTDR MEMDRY CIRCUITS

INDUSTRIAL INSTRUMENTATIDNS, INC.

3478330 - DATA STDRAGE CIRCUIT UTILIZING A CDNTRDLLED RECTIFIER

INNDTECH CDRPDRATION

4050082 - GLASS SWITCHING DEVICE USING AN IDN IMPERMEABLE GLASS ACTIVE LAYER

INTEL CDRPDRATIDN

3593037 - CELL FDR MDS RANDDM-ACESS INTEGRATED CIRCUIT MEMDRY
3660819 - FLDATING GATE TRANSISTDR AND METHDD FDR CHARGING AND DISCHARGING SAME
3706079 - THREE-LINE CELL FOR RANDDM-ACCESS INTEGRATED CIRCUIT MEMDRY
3728695 - RANDDM-ACCESS FLDATING GATE MDS MEMDRY ARRAY
3744036 - ELECTRICALLY PRDGRAMMABLE READ DNLY MEMDRY ARRAY
3810127 - PRDGRAMMABLE CIRCUIT-THE METHDD DF PRDGRAMMING THEREDF AND THE DEVICES SD PRDGRAMMED
3825946 - ELECTRICALLY ALTERABLE FLDATING GATE DEVICE AND METHDD FDR ALTERING SAME
3936813 - BIPDLAR MEMDRY CELL EMPLDYING INVERTED TRANSISTDRS AND PINCHED BASE RESISTDRS
3938108 - ERASABLE PRDGRAMMABLE READ-DNLY MEMDRY
3944990 - SEMICDNDUCTDR MEMDRY EMPLDYING CHARGE-CDUPLED SHIFT REGISTERS WITH MULTIPLEXED REFRESH AMPLIFIERS
3946368 - SYSTEM FDR CDMPENSATING VDLTAGE FDR A CCD SENSING CIRCUIT
3946369 - HIGH SPEED MDS RAM EMPLDYING DEPLETIDN LDADS
3978459 - HIGH DENSITY MDS MEMDRY ARRAY
3984822 - DDUBLE PDLYCRYSTALLINE SILICDN GATE MEMDRY DEVICE
4038646 - DYNAMIC MDS RAM
4099196 - TRIPLE LAYER PDLYSILICDN CELL
4180826 - MDS DDUBLE POLYSILICDN READ-DNLY MEMDRY AND CELL
4203158 - ELECTRICALLY PRDGRAMMABLE AND ERASABLE MDS FLOATING GATE MEMDRY DEVICE EMPLOYING TUNNELING AND METHDD DF FABRICATING SAM E
4207615 - NDN-VDLATILE RAM CELL
4266283 - ELECTRICALLY ALTERABLE READ-MDSTLY MEMDRY
4287570 - MULTIPLE BIT READ-DNLY MEMDRY CELL AND ITS SENSE AMPLIFIER

INTERNATIONAL BUSINESS MACHINES CDRPDRATIDN

3423737 - NDNDESTRUCTIVE READ TRANSISTOR MEMDRY CELL
3441912 - FEEDBACK CURRENT SWITCH MEMDRY CELL
3445831 - DRIVE SYSTEM FDR A MAGNETIC CDRE ARRAY
3449727 - TRANSISTDR LATCH MEMDRY DRIVEN BY CDINCIDENTALLY APPLIED DPDSITELY DIRECTED PULSES
3449728 - FEEDBACK CURRENT SWITCH MEMDRY ELEMENT

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

INTERNATIONAL BUSINESS MACHINES CORPORATION (CONTINUEO)

3461312 - SIGNAL STORAGE CIRCUIT UTILIZING CHARGE STORAGE CHARACTERISTICS OF FIELO-EFFECT TRANSISTOR
3492661 - MONOLITHIC ASSOCIATIVE MEMORY CELL
3500341 - BISTABLE MONOLITHIC STORAGE MATRIX WITH NON-RESTRICTIVE REAOOUT PERFORMING LOGICAL OPERATIONS
3504351 - OATA STORE
3505573 - LOW STANOBY POWER MEMORY CELL
3519999 - THIN POLYMERIC FILM MEMORY OEVICE
3531778 - OATA STORAGE OEVICES USING CROSS-COUPLEO PLURAL EMITTER TRANSISTORS
3533085 - ASSOCIATIVE MEMORY WITH HIGH, LOW ANO EQUAL SEARCH
3535699 - COMPLEMENTARY TRANSISTOR MEMORY CELL USING LEAKAGE CURRENT TO SUSTAIN QUIESCENT CONOITION
3537078 - MEMORY CELL WITH A NON-LINEAR COLLECTOR LOAO
3541530 - PULSEO POWER FOUR OEVICE MEMORY CELL
3543296 - OATA STORAGE CELL FOR MULTI-STABLE ASSOCIATIVE MEMORY SYSTEM
3548388 - STORAGE CELL WITH A CHARGE TRANSFER LOAO INCLUOING SERIES CONNECTEO FETS
3551761 - INTEGRATEO PHOTOOIOOE ARRAY
3553658 - ACTIVE STORAGE ARRAY HAVING OIOOES FOR STORAGE ELEMENTS
3560764 - PULSE POWEREO OATA STORAGE CELL
3560940 - TIME SHAREO INTERCONNECTION APPARATUS
3564300 - PULSE POWER OATA STORAGE CELL
3569945 - LOW POWER SEMICONOUCTOR OIOOE SIGNAL STORAGE OEVICE
3573758 - NON-LINEAR IMPEOANCE MEANS FOR TRANSISTORS CONNECTEO TO EACH OTHER ANO TO A COMMON POWER SOURCE
3585613 - FIELO EFFECT TRANSISTOR CAPACITOR STORAGE CELL
3588528 - FOR PHASE OIOOE-FET SHIFT REGISTER
3588846 - STORAGE CELL WITH VARIABLE POWER LEVEL
3603820 - BISTABLE OEVICE STORAGE CELL
3609702 - ASSOCIATIVE MEMORY
3609712 - INSULATEO GATE FIELO EFFECT TRANSISTOR MEMORY ARRAY
3610967 - INTEGRATEO MEMORY CELL CIRCUIT
3617772 - SENSE AMPLIFIER/BIT ORIVER FOR A MEMORY CELL
3623029 - BISTABLE MULTI-EMITTER SILICON CONTROLLEO RECTIFIER STORAGE CELL
3626157 - FIELO EFFECT PERFORATEO MEOIA REAOER
3626387 - FET STORAGE-THRESHOLO VOLTAGE CHANGEO BY IRRAOIATION
3626390 - MINI MEMORY CELL WITH EPITAXIAL LAYER RESISTORS ANO OIOOE ISOLATION
3638203 - RANOOM ACCESS SOLIO STATE MEMORY USING SCR'S
3638204 - SEMI-CONOUCTIVE CELL FOR A STORAGE HAVING A PLURALITY OF SIMULTANEOUSLY ACCESSIBLE LOCATIONS
3641516 - WRITE ONCE REAO ONLY STORE SEMICONOUCTOR MEMORY
3643231 - MONOLITHIC ASSOCIATIVE MEMORY CELL
3643235 - MONOLITHIC SEMICONOUCTOR MEMORY
3643236 - STORAGE HAVING A PLURALITY OF SIMULTANEOUSLY ACCESSIBLE LOCATIONS
3646525 - OATA REGENERATION SCHEME WITHOUT USING MEMORY SENSE AMPLIFIERS
3655999 - SHIFT REGISTER
3656117 - TERNARY REAO-ONLY MEMORY
3660822 - VARIABLE BREAKOOWN STORAGE CELL WITH NEGATIVE RESISTANCE OPERATING CHARACTERISTIC
3662351 - ALTERABLE-LATENT IMAGE MONOLITHIC MEMORY
3671772 - OIFFERENCE AMPLIFIER
3675218 - INOEPENOENT REAO-WRITE MONOLITHIC MEMORY ARRAY
3676863 - MONOLITHIC BIPOLAR OYNAMIC SHIFT REGISTER
3678475 - REAO ONLY MEMORY ANO METHOO OF USING SAME
3688280 - MONOLITHIC MEMORY SYSTEM WITH BI-LEVEL POWERING FOR REOUCEO POWER CONSUMPTION
3697962 - TWO OEVICE MONOLITHIC BIPOLAR MEMORY ARRAY
3702464 - INFORMATION CARO
3706891 - A.C. STABLE STORAGE CELL
3706977 - FUNCTIONAL MEMORY STORAGE CELL
3706978 - FUNCTIONAL STORAGE ARRAY
3708788 - ASSOCIATIVE MEMORY CELL ORIVER ANO SENSE AMPLIFIER CIRCUIT
3717852 - ELECTRONICALLY REWRITABLE REAO-ONLY MEMORY USING VIA CONNECTIONS

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

INTERNATIONAL BUSINESS MACHINES CORPORATION (CONTINUEO)

3725878 - MEMORY CELL CIRCUIT
3725879 - FUNCTIONAL MEMORY CELL
3729719 - STOREO CHARGE STORAGE CELL USING A NON LATCHING SCR TYPE OEVICE
3732440 - AOORESS OECOOER LATCH
3735358 - SPECIALIZEO ARRAY LOGIC
3736573 - RESISTOR SENSING BIT SWITCH
3739356 - HETEROJUNCTION INFORMATION STORAGE UNIT
3740730 - LATCHABLE OECOOER ORIVER ANO MEMORY ARRAY
3745539 - LATCH TYPE REGENERATIVE CIRCUIT FOR REAOING A OYNAMIC MEMORY CELL
3747078 - COMPENSATION TECHNIQUE FOR VARIATIONS IN BIT LINE IMPEOANCE
3751687 - INTEGRATEO SEMICONOUCTOR CIRCUIT FOR OATA STORAGE
3755791 - MEMORY SYSTEM WITH TEMPORARY OR PERMANENT SUBSTITUTION OF CELLS FOR OEFECTIVE CELLS
3755793 - LATENT IMAGE MEMORY WITH SINGLE-OEVICE CELLS OF TWO TYPES
3757313 - OATA STORAGE WITH PREOETERMINEO SETTABLE CONFIGURATION
3761896 - MEMORY ARRAY OF CELLS CONTAINING BISTABLE SWITCHABLE RESISTORS
3781828 - THREE-OIMENSIONALLY-AOORESSEO MEMORY
3789247 - OYANMICALLY OROEREO BIOIRECTIONAL SHIFT REGISTER HAVING CHARGE COUPLEO OEVICES
3797000 - NON-VOLATILE SEMICONOUCTOR STORAGE OEVICE UTILIZING AVALANCHE INJECTION ANO EXTRACTION OF STOREO INFORMATION
3798621 - MONOLITHIC STORAGE ARRANGEMENT WITH LATENT BIT PATTERN
3801965 - WRITE SUPPRESSION IN BIPOLAR TRANSISTOR MEMORY CELLS
3801967 - MONOLITHIC BIPOLAR TRANSISTOR STORAGE ARRANGEMENT WITH LATENT BIT PATTERN
3810123 - MONOLITHIC STORAGE MULTI-EMITTER TRANSISTORS WITH OIFFERENT WIOTH BASES
3810124 - MEMORY ACCESSING SYSTEM
3810128 - SEMICONOUCTOR SWITCHING ANO STORAGE OEVICE
3811076 - FIELO EFFECT TRANSISTOR INTEGRATEO CIRCUIT ANO MEMORY
3812477 - METHOO FOR SUPERRESOLUTION IN AN OPTICAL MEMORY
3820086 - REAO ONLY MEMORY (ROM) SUPERIMPOSEO ON REAO/WRITE MEMORY (RAM)
3820087 - THREE OIMENSIONAL MEMORY
3838405 - NON-VOLATILE OIOOE CROSS POINT MEMORY ARRAY
3843954 - HIGH-VOLTAGE INTEGRATEO ORIVER CIRCUIT ANO MEMORY EMBOOYING SAME
3846768 - FIXEO THRESHOLO VARIABLE THRESHOLO STORAGE OEVICE FOR USE IN A SEMICONOUCTOR STORAGE ARRAY
3851317 - OOUBLE OENSITY NON-VOLATILE MEMORY ARRAY
3852723 - PROGRAMMABLE SIGNAL OISTRIBUTION SYSTEM
3858060 - INTEGRATEO ORIVER CIRCUIT
3863229 - SCR (OR SCS) MEMORY ARRAY WITH INTERNAL ANO EXTERNAL LOAO RESISTORS
3876989 - CCO OPTICAL SENSOR STORAGE OEVICE HAVING CONTINUOUS LIGHT EXPOSURE COMPENSATION
3876992 - BIPOLAR TRANSISTOR MEMORY WITH CAPACITIVE STORAGE
3879621 - SENSE AMPLIFIER
3882467 - COMPLEMENTARY FIELO EFFECT TRANSISTOR MEMORY CELL
3893085 - REAO MOSTLY MEMORY CELL HAVING BIPOLAR ANO FAMOS TRANSISTOR
3898630 - HIGH VOLTAGE INTEGRATEO ORIVER CIRCUIT
3899777 - MEANS FOR EQUALIZING LINE POTENTIAL WHEN THE CONNECTING SWITCH IS OPEN
3900838 - HYBRIO STORAGE CIRCUIT
3909803 - MULTI-PHASE CCO SHIFT REGISTER OPTICAL SENSOR WITH HIGH RESOLUTION
3909808 - MINIMUM PITCH MOSFET OECOOER CIRCUIT CONFIGURATION
3911290 - N-PHASE BUCKET BRIGAOE OPTICAL SCANNER
3911464 - NONVOLATILE SEMICONOUCTOR MEMORY
3914749 - O.C. STABLE SINGLE OEVICE MEMORY CELL
3916390 - OYNAMIC MEMORY WITH NON-VOLATILE BACK-UP MOOE
3918033 - SCR MEMORY CELL
3919569 - OYNAMIC TWO OEVICE MEMORY CELL WHICH PROVIOES O.C. SENSE SIGNALS
3949383 - O. C. STABLE SEMICONOUCTOR MEMORY CELL
3949385 - O.C. STABLE SEMICONOUCTOR MEMORY CELL
3950732 - SINGLE TECHNOLOGY TEXT EOITING SYSTEM
3953839 - BIT CIRCUITRY FOR ENHANCE-OEPLETE RAM

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

INTERNATIONAL BUSINESS MACHINES CORPORATION (CONTINUED)

3969707 - CONTENT-ADDRESSABLE MEMORY CAPABLE OF A HIGH SPEED SEARCH
3969708 - STATIC FOUR DEVICE MEMORY CELL
3974486 - MULTIPLICATION MODE BISTABLE FIELD EFFECT TRANSISTOR AND MEMORY UTILIZING SAME
3979734 - MULTIPLE ELEMENT CHARGE STORAGE MEMORY CELL
3983543 - RANDOM ACCESS MEMORY READ/WRITE BUFFER CIRCUITS INCORPORATING COMPLEMENTARY FIELD EFFECT TRANSISTORS
3983544 - SPLIT MEMORY ARRAY SHARING SAME SENSING AND BIT DECODE CIRCUITRY
3983545 - RANDOM ACCESS MEMORY EMPLOYING SINGLE ENDED SENSE LATCH FOR ONE DEVICE CELL
3986054 - HIGH VOLTAGE INTEGRATED DRIVER CIRCUIT
3986173 - MEMORY CIRCUIT
3986180 - DEPLETION MODE FIELD EFFECT TRANSISTOR MEMORY SYSTEM
3991408 - SELF-SEQUENCING MEMORY
3992701 - NON-VOLATILE MEMORY CELL AND ARRAY USING SUBSTRATE CURRENT
3993917 - PARAMETER INDEPENDENT FET SENSE AMPLIFIER
3995172 - ENHANCEMENT-AND DEPLETION-TYPE FIELD EFFECT TRANSISTORS CONNECTED IN PARALLEL
4006469 - DATA STORAGE CELL WITH TRANSISTORS OPERATING AT DIFFERENT THRESHOLD VOLTAGES
4007451 - METHOD AND CIRCUIT ARRANGEMENT FOR OPERATING A HIGHLY INTEGRATED MONOLITHIC INFORMATION STORE
4009472 - DYNAMIC ASSOCIATIVE CELL
4010453 - STORED CHARGE DIFFERENTIAL SENSE AMPLIFIER
4021789 - SELF-ALIGNED INTEGRATED CIRCUITS
4023147 - ASSOCIATIVE CAPACITIVE STORAGE CIRCUITS
4023148 - WRITE SPEED-UP CIRCUIT FOR INTEGRATED DATA MEMORIES
4025908 - DYNAMIC ARRAY WITH CLAMPED BOOTSTRAP STATIC INPUT/OUTPUT CIRCUITRY
4025909 - SIMPLIFIED DYNAMIC ASSOCIATIVE CELL
4039861 - CROSS-COUPLED CHARGE TRANSFER SENSE AMPLIFIER CIRCUITS
4040016 - TWIN NODES CAPACITANCE MEMORY
4040017 - INJECTED CHARGE CAPACITOR MEMORY
4057787 - READ ONLY MEMORY
4057789 - REFERENCE VOLTAGE SOURCE FOR MEMORY CELLS
4068217 - ULTIMATE DENSITY NON-VOLATILE CROSS-POINT SEMICONDUCTOR MEMORY ARRAY
4070656 - READ/WRITE SPEED UP CIRCUIT FOR INTEGRATED DATA MEMORIES
4080590 - CAPACITOR STORAGE MEMORY
4090254 - CHARGE INJECTOR TRANSISTOR MEMORY
4090255 - CIRCUIT ARRANGEMENT FOR OPERATING A SEMICONDUCTOR MEMORY SYSTEM
4103312 - SEMICONDUCTOR MEMORY DEVICES
4115794 - CHARGE PUMPING DEVICE WITH INTEGRATED REGULATING CAPACITOR AND METHOD FOR MAKING SAME
4117546 - INTERLACED CCD MEMORY
4122548 - MEMORY STORAGE ARRAY WITH RESTORE CIRCUIT
4127899 - SELF-QUENCHING MEMORY CELL
4130766 - BUCKET BRIGADE CIRCUIT
4130894 - LOOP ORGANIZED SERIAL-PARALLEL-SERIAL MEMORY STORAGE SYSTEM
4139910 - CHARGE COUPLED DEVICE MEMORY WITH METHOD OF DOUBLED STORAGE CAPACITY AND INDEPENDENT OF PROCESS PARAMETERS AND TEMPERATURE
4140921 - GENERALIZED PERFORMANCE POWER OPTIMIZED PLA CIRCUITS
4151603 - PRECHARGED FET ROS ARRAY
4152781 - MULTIPLEXED AND INTERLACED CHARGE-COUPLED SERIAL-PARALLEL-SERIAL MEMORY DEVICE
4158237 - MONOLITHICALLY INTEGRATED STORAGE CELLS
4158239 - RESISTIVE GATE FET FLIP-FLOP STORAGE CELL
4158240 - METHOD AND SYSTEM FOR DATA CONVERSION
4165539 - BIDIRECTIONAL SERIAL-PARALLEL-SERIAL CHARGE-COUPLED DEVICE
4181981 - BIPOLAR TWO DEVICE DYNAMIC MEMORY CELL
4193127 - SIMULTANEOUS READ/WRITE CELL
4196363 - OPEN COLLECTOR BIT DRIVER/SENSE AMPLIFIER
4196389 - TEST SITE FOR A CHARGED COUPLED DEVICE (CCD) ARRAY
4198696 - LASER CUT STORAGE CELL
4202044 - QUATERNARY FET READ ONLY MEMORY

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

INTERNATIONAL BUSINESS MACHINES CORPORATION (CONTINUED)
4225947 - THREE PHASE LINE-ADDRESSABLE SERIAL-PARALLEL-SERIAL STORAGE ARRAY
4228526 - LINE-ADDRESSABLE SERIAL-PARALLEL-SERIAL ARRAY
4230954 - PERMANENT OR SEMIPERMANENT CHARGE TRANSFER STORAGE SYSTEMS
4259730 - IIL WITH PARTIALLY SPACED COLLARS
4279023 - SENSE LATCH
4280197 - MULTIPLE ACCESS STORE
4280198 - METHOD AND CIRCUIT ARRANGEMENT FOR CONTROLLING AN INTEGRATED SEMICONDUCTOR MEMORY
4287571 - HIGH DENSITY TRANSISTOR ARRAYS
4287575 - HIGH SPEED HIGH DENSITY, MULTI-PORT RANDOM ACCESS MEMORY CELL
4288864 - SERIAL-PARALLEL-SERIAL CCD MEMORY SYSTEM WITH FAN OUT AND FAN IN CIRCUITS
4292675 - FIVE DEVICE MERGED TRANSISTOR RAM CELL
4300210 - CALIBRATED SENSING SYSTEM
4302764 - NONDESTRUCTIVE READ-OUT DYNAMIC MEMORY CELL
4302823 - DIFFERENTIAL CHARGE SENSING SYSTEM
4303992 - SERIAL PARALLEL CHARGE COUPLED DEVICE EMPLOYING A GATE SPLITTING DEVICE
4305139 - STATE DETECTION FOR STORAGE CELLS
4306300 - MULTI-LEVEL CHARGE-COUPLED DEVICE MEMORY SYSTEM INCLUDING ANALOG-TO-DIGITAL AND TRIGGER COMPARATOR CIRCUITS
4313177 - STORAGE CELL SIMULATION FOR GENERATING A REFERENCE VOLTAGE FOR SEMICONDUCTOR STORES IN MTL TECHNOLOGY
4319344 - METHOD AND CIRCUIT ARRANGEMENT FOR DISCHARGING BIT LINE CAPACITANCES OF AN INTEGRATED SEMICONDUCTOR MEMORY
4322823 - STORAGE SYSTEM HAVING BILATERAL FIELD EFFECT TRANSISTOR PERSONALIZATION
4323986 - ELECTRONIC STORAGE ARRAY HAVING DC STABLE CONDUCTIVITY MODULATED STORAGE CELLS
4327424 - READ-ONLY STORAGE USING ENHANCEMENT-MODE, DEPLETION-MODE OR OMITTED GATE FIELD-EFFECT TRANSISTORS
4334292 - LOW VOLTAGE ELECTRICALLY ERASABLE PROGRAMMABLE READ ONLY MEMORY
4335450 - NON-DESTRUCTIVE READ OUT FIELD EFFECT TRANSISTOR MEMORY CELL SYSTEM
4336603 - THREE TERMINAL ELECTRICALLY ERASABLE PROGRAMMABLE READ ONLY MEMORY

INTERNATIONAL STANDARD ELECTRIC CORPORATION
3503051 - WORD ORGANIZED MEMORY COMPRISING FLIP-FLOPS WITH RESET MEANS ASSOCIATED WITH EACH FLIP-FLOP IN THE FORM OF A CLEARING LINE GENERATOR COUPLED TO THE EMITTER OF ONE OF THE TRANSISTORS OF THE FLIP-FLOP
3544977 - ASSOCIATIVE MEMORY MATRIX USING SERIES CONNECTED DIODES HAVING VARIABLE RESISTANCE VALUES
3546682 - MEMORY USING INTEGRATED CIRCUITS AS UNITARY CROSSPOINTS

INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION
3467945 - ELECTRICALLY CONTROLLED MATRIX
3651489 - SECONDARY EMISSION FIELD EFFECT CHARGE STORAGE SYSTEM
3979700 - VIDEO PROCESSOR
4144586 - SUBSTRATE-FED INJECTION-COUPLED MEMORY

INTERSIL, INC.
3725881 - TWO TERMINAL BIPOLAR MEMORY CELL
3733690 - DOUBLE JUNCTION READ ONLY MEMORY AND PROCESS OF MANUFACTURE
3742592 - ELECTRICALLY ALTERABLE INTEGRATED CIRCUIT READ ONLY MEMORY UNIT AND PROCESS OF MANUFACTURING
3848238 - DOUBLE JUNCTION READ ONLY MEMORY
3971058 - DUAL EMITTER PROGRAMMABLE MEMORY ELEMENT AND MATRIX

ITT INDUSTRIES, INC.
4130890 - INTEGRATED DOC MEMORY WITH BITWISE ERASE
4288863 - PROGRAMMABLE SEMICONDUCTOR MEMORY CELL

LICENTIA PATENT-VERWALTUNGS-GMBH
3796931 - P-N JUNCTION SEMICONDUCTOR DEVICE PROVIDED WITH AN INSULATING LAYER HAVING TWO STABLE, RESISTANCE STATES
4176442 - METHOD FOR PRODUCING A SEMICONDUCTOR FIXED VALUE ROM

LITTON SYSTEMS INC.
3636530 - NON-VOLATILE DIRECT STORAGE BISTABLE CIRCUIT

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

LITTON SYSTEMS INC. (CONTINUED)
- 3660827 - BISTABLE ELECTRICAL CIRCUIT WITH NON-VOLATILE STORAGE CAPABILITY
- 3693174 - ASSOCIATIVE MEMORY OEVICE AND SYSTEM
- 3701117 - PHOTO-SELECT MEMORY SWITCH

LOCKHEED ELECTRONICS COMPANY, INC.
- 3789371 - MOSFET MEMORY CELL

LSI SYSTEMS INCORPORATED
- 3881175 - INTEGRATED CIRCUIT SOS MEMORY SUBSYSTEM AND METHOD OF MAKING SAME

MARCONI COMPANY LIMITED
- 3668656 - MEMORY CELLS
- 3693170 - MEMORY CELLS
- 3827033 - SEMI-CONDUCTOR MEMORY OEVICE ARRANGEMENTS

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
- 3497698 - METAL INSULATOR SEMICONDUCTOR RADIATION DETECTOR
- 3746867 - RADIATION RESPONSIVE SIGNAL STORAGE DEVICE
- 3987474 - NON-VOLATILE CHARGE STORAGE ELEMENTS ANO AN INFORMATION STORAGE APPARATUS EMPLOYING SUCH ELEMENTS
- 4025910 - SOLID-STATE CAMERA EMPLOYING NON-VOLATILE CHARGE STORAGE ELEMENTS
- 4041475 - COMPUTER MEMORY
- 4051462 - COMPUTER MEMORY
- 4101965 - SURFACE ACOUSTIC WAVE OEVICES FOR PROCESSING AND STORING SIGNALS
- 4290118 - SOLIO STATE DEVICES COMBINING THE USE OF SURFACE-ACOUSTIC-WAVE OEVICES AND CHARGE-COUPLED DEVICES
- 4291390 - ANALOG SOLID STATE MEMORY
- 4313178 - ANALOG SOLID STATE MEMORY

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTO.
- 3623025 - VARIABLE RESISTANCE INFORMATION READING ELEMENT
- 3680059 - MEMORY DEVICE UTILIZING PULSE GENERATING DIOOE
- 3931632 - SWITCHING OEVICE EQUIPPEO WITH A SEMICONDUCTOR MEMORY ELEMENT
- 4094007 - TEMPERATURE-COMPENSATED ANALOG VOLTAGE MEMORY OEVICE
- 4117514 - SOLID STATE IMAGING OEVICE
- 4134150 - RANDOM ACCESS MONOSTABLE MEMORY CELL HAVING BOTH STATIC AND OYNAMIC OPERATING MOOES
- 4143286 - SEMICONDUCTOR MEMORY DEVICE

MATSUSHITA ELECTRONICS CORPORATION
- 4053798 - NEGATIVE RESISTANCE OEVICE

MCDONNELL OOUGLAS CORPORATION
- 3988742 - RECOROER USING LIGHT EMITTING OIOOES
- 4092733 - ELECTRICALLY ALTERABLE INTERCONNECTION

MESSERSCHMITT-BOLKOW-BLOHM GMBH
- 3691533 - ELECTROCHEMICAL OATA STORAGE WITH ELECTRON BEAM ACCESSING

MICRO-BIT CORPORATION
- 3736571 - CONDUCTOR-INSULATOR-SEMICONDUCTOR CAPACITOR MEMORY HAVING INCREASEO STORAGE CAPABILITY
- 4068218 - METHOO ANO APPARATUS FOR OEEP OEPLETION REAO-OUT OF MOS ELECTRON BEAM AOORESSABLE MEMORIES

MICROSYSTEMS INTERNATIONAL LIMITEO
- 3800299 - MEMORY CELL ARRAY WITH MULTIPLEXEO COLUMN SELECT LINES

MICRO-TECHNOLOGY
- 4150441 - CLOCKED STATIC MEMORY

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

MIDWEST RESEARCH INSTITUTE
3480918 - THREE-DIMENSIONAL MEMORY HAVING PHOTON EXCITABLE IMPURITY SEMICONDUCTOR STORAGE VOLUME

MITSUBISHI DENKI KABUSHIKI KAISHA
4081697 - SEMICONDUCTOR MEMORY DEVICE
4333168 - MEMORY CIRCUIT

MONOLITHIC MEMORIES, INC.
4130889 - PROGRAMMABLE WRITE-ONCE, READ-ONLY SEMICONDUCTOR MEMORY ARRAY USING SCR CURRENT SINK AND CURRENT SOURCE DEVICES

MOS TECHNOLOGY, INC.
3855581 - SEMICONDUCTOR DEVICE AND CIRCUITS

MOSTEK CORPORATION
3821717 - DYNAMIC RANDOM ACCESS MEMORY
4061999 - DYNAMIC RANDOM ACCESS MEMORY SYSTEM
4125854 - SYMMETRICAL CELL LAYOUT FOR STATIC RAM
4251876 - EXTREMELY LOW CURRENT LOAD DEVICE FOR INTEGRATED CIRCUIT
4301535 - PROGRAMMABLE READ ONLY MEMORY INTEGRATED CIRCUIT WITH BIT-CHECK AND DEPROGRAMMING MODES AND METHODS FOR PROGRAMMING AND TESTING SAID CIRCUIT
4308594 - MOS MEMORY CELL
4328563 - HIGH DENSITY READ ONLY MEMORY
4331968 - THREE LAYER FLOATING GATE MEMORY TRANSISTOR WITH ERASE GATE OVER FIELD OXIDE REGION

MOTOROLA INC.
3538348 - SENSE-WRITE LOGIC CIRCUITS TO
3594736 - MOS READ-WRITE SYSTEM
3679913 - BINARY FLIP-FLOP EMPLOYING INSULATED GATE FIELD EFFECT TRANSISTORS AND SUITABLE FOR CASCADED FREQUENCY DIVIDER OPERATION
3760380 - SILICON GATE COMPLEMENTARY MOS DYNAMIC RAM
3835457 - DYNAMIC MOS TTL COMPATIBLE
3872450 -
3889287 - MNOS MEMORY MATRIX
3906463 - MOS MEMORY SYSTEM
3906464 - EXTERNAL DATA CONTROL PRESET SYSTEM FOR INVERTING CELL RANDOM ACCESS MEMORY
3919566 - SENSE-WRITE CIRCUIT FOR BIPOLAR INTEGRATED CIRCUIT RAM
3973246 - SENSE-WRITE CIRCUIT FOR BIPOLAR INTEGRATED CIRCUIT RAM
3986174 - COMMUNICATION SWITCHING SYSTEM
4004285 - READ-WRITE CIRCUITRY FOR ONE TRANSISTOR PER BIT RANDOM ACCESS MEMORY
4011549 - SELECT LINE HOLD DOWN CIRCUIT FOR MOS MEMORY DECODER
4023149 - STATIC STORAGE TECHNIQUE FOR FOUR TRANSISTOR IGFET MEMORY CELL
4028671 - CHARGE COUPLED STORAGE DEVICE MULTIPLEXER
4037243 - SEMI CONDUCTOR MEMORY CELL UTILIZING SENSING OF VARIATIONS IN PN JUNCTION CURRENT CONROLLED BY STORED DATA
4048629 - LOW POWER MOS RAM ADDRESS DECODE CIRCUIT
4064493 - P-ROM CELL HAVING A LOW CURRENT FUSIBLE PROGRAMMING LINK
4075609 - ON-CHIP VOLTAGE SOURCE FOR INTEGRATED CIRCUITS
4090256 - FIRST-IN-FIRST-OUT REGISTER IMPLEMENTED WITH SINGLE RANK STORAGE ELEMENTS
4099070 - SENSE-WRITE CIRCUIT FOR RANDOM ACCESS MEMORY
4099263 - BUFFERING FOR AN I\2/ L MEMORY CELL
4099265 - SENSE LINE BALANCE CIRCUIT FOR STATIC RANDOM ACCESS MEMORY
4110840 - SENSE LINE CHARGING SYSTEM FOR RANDOM ACCESS MEMORY
4118642 - HIGHER DENSITY INSULATED GATE FIELD EFFECT CIRCUIT
4128879 - RECIRCULATING MEMORY WITH PLURAL INPUT-OUTPUT TAPS
4145759 - VIRTUAL POWER SUPPLY ROM
4190849 - ELECTRONIC-BEAM PROGRAMMABLE SEMICONDUCTOR DEVICE STRUCTURE
4206370 - SERIAL-PARALLEL-LOOP CCD REGISTER
4221977 - STATIC I+HU 2+B L RAM

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

MOTOROLA INC. (CONTINUED)
- 4237547 - PROGRAM DECODER FOR SHARED CONTACT EPROM
- 4263663 - VMOS ROM ARRAY
- 4272830 - ROM STORAGE LOCATION HAVING MORE THAN TWO STATES
- 4289982 - APPARATUS FOR PROGRAMMING A DYNAMIC EPROM
- 4312047 - MEMORY ARRAY HAVING IMPROVED ISOLATION BETWEEN SENSE LINES
- 4318014 - SELECTIVE PRECHARGE CIRCUIT FOR READ-ONLY-MEMORY

NATIONAL RESEARCH DEVELOPMENT CORPORATION
- 3594618 - ELECTRONIC LOGIC ELEMENT

NATIONAL SEMICONDUCTOR CORPORATION
- 4004286 - PROGRAMMABLE RANDOM ACCESS MEMORY (PRAM) INTEGRATED CIRCUIT MEMORY DEVICE
- 4189785 - COMPLEMENTARY MOS MEMORY ARRAY INCLUDING COMPLEMENTARY MOS MEMORY CELLS THEREFOR
- 4193007 - EMITTER COUPLED LOGIC MASTER-SLAVE FLIP-FLOP WITH EMITTER-FOLLOWER CLOCK ENTRY
- 4238839 - LASER PROGRAMMABLE READ ONLY MEMORY
- 4257056 - ELECTRICALLY ERASABLE READ ONLY MEMORY

NCR CORPORATION
- 3466626 - COMPUTER MEMORY HAVING ONE-ELEMENT-PER-BIT STORAGE AND TWO-ELEMENTS-PER-BIT-NOISE CANCELLATION
- 3614750 - READ-ONLY MEMORY CIRCUIT
- 3651492 - NONVOLATILE MEMORY CELL
- 3653002 - NONVOLATILE MEMORY CELL
- 3676717 - NONVOLATILE FLIP-FLOP MEMORY CELL
- 3680061 - INTEGRATED CIRCUIT BIPOLAR RANDOM ACCESS MEMORY SYSTEM WITH LOW STAND-BY POWER CONSUMPTION
- 3701118 - OPTICAL STORAGE MEDIUM AND METHOD OF MAKING AND USING
- 3721962 - BEAM ACCESSED MOS MEMORY WITH BEAM READING, WRITING, AND ERASING
- 3761901 - NONVOLATILE MEMORY CELL
- 3771148 - NONVOLATILE CAPACITIVE MEMORY CELL
- 3774177 - NONVOLATILE RANDOM ACCESS MEMORY CELL USING AN ALTERABLE THRESHOLD FIELD EFFECT WRITE TRANSISTOR
- 3855582 - PARALLEL BIASED PHOTODETECTOR MATRIX
- 3922650 - SWITCHED CAPACITOR NON-VOLATILE MNOS RANDOM ACCESS MEMORY CELL
- 4094008 - ALTERABLE CAPACITOR MEMORY ARRAY
- 4175291 - NON-VOLATILE RANDOM ACCESS MEMORY CELL
- 4183095 - HIGH DENSITY MEMORY DEVICE
- 4185324 - DATA STORAGE SYSTEM
- 4192014 - ROM MEMORY CELL WITH 2+HU N +B FET CHANNEL WIDTHS
- 4202046 - DATA STORAGE SYSTEM FOR STORING MULTILEVEL SIGNALS
- 4224686 - ELECTRICALLY ALTERABLE MEMORY CELL
- 4271487 - STATIC VOLATILE/NON-VOLATILE RAM CELL

NIPPON ELECTRIC CO., LTD.
- 3467952 - FIELD EFFECT TRANSISTOR INFORMATION STORAGE CIRCUIT
- 3510849 - MEMORY DEVICES OF THE SEMICONDUCTOR TYPE HAVING HIGH-SPEED READOUT MEANS
- 3539839 - SEMICONDUCTOR MEMORY DEVICE
- 3551899 - ASSOCIATIVE MEMORY EMPLOYING BISTABLE CIRCUITS AS MEMORY CELLS
- 3646527 - ELECTRONIC MEMORY CIRCUIT EMPLOYING SEMICONDUCTOR MEMORY ELEMENTS AND A METHOD FOR WRITING TO THE MEMORY ELEMENT
- 3651490 - THREE DIMENSIONAL MEMORY UTILIZING SEMICONDUCTOR MEMORY DEVICES
- 3663871 - MIS-TYPE SEMICONDUCTOR READ ONLY MEMORY DEVICE AND METHOD OF MANUFACTURING THE SAME
- 3665423 - MEMORY MATRIX USING MIS SEMICONDUCTOR ELEMENT
- 3702466 - SEMICONDUCTOR INTEGRATED CIRCUIT MEMORY DEVICE UTILIZING INSULATED GATE TYPE SEMICONDUCTOR ELEMENTS
- 3703709 - HIGH SPEED ASSOCIATIVE MEMORY CIRCUITS
- 3708787 - READ-ONLY MEMORY EMPLOYING METAL-INSULATOR-SEMICONDUCTOR TYPE FIELD EFFECT TRANSISTORS
- 3718916 - SEMICONDUCTOR MEMORY ELEMENT
- 3729723 - MEMORY CIRCUIT
- 3962686 - MEMORY CIRCUIT

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

NIPPON ELECTRIC CO., LTD. (CONTINUEO)
- 4016588 - NON-VOLATILE SEMICONOUCTOR MEMORY OEVICE
- 4045784 - PROGRAMMABLE REAO ONLY MEMORY INTEGRATEO CIRCUIT OEVICE
- 4051388 - FLIP-FLOP ACCOMPANIED BY TWO CURRENT SWITCHES, ONE HAVING A SMALLER CURRENT SINK CAPABILITY THAN THE OTHER
- 4054865 - SENSE LATCH CIRCUIT FOR A BISECTIONAL MEMORY ARRAY
- 4084108 - INTEGRATED CIRCUIT DEVICE
- 4125878 - MEMORY CIRCUIT
- 4133049 - MEMORY CIRCUIT ARRANGEMENT UTILIZING ONE-TRANSISTOR-PER-BIT MEMORY CELLS
- 4165538 - REAO-ONLY MEMORY
- 4184085 - SEMICONDUCTOR MEMORY OEVICE COMPRISING A P-N JUNCTION IN A POLYCRYSTALLINE SEMICONDUCTOR LAYER
- 4233526 - SEMICONDUCTOR MEMORY DEVICE HAVING MULTI-GATE TRANSISTORS
- 4298960 - MEMORY INTEGRATED CIRCUIT
- 4298962 - MEMORY
- 4334295 - MEMORY OEVICE
- 4335449 - SEMICONOUCTOR MEMORY OEVICE

NIPPON GAKKI SEIZO KABUSHIKI KAISHA
- 3812478 - SEMICONDUCTOR STORAGE DEVICE
- 4150392 - SEMICONDUCTOR INTEGRATED FLIP-FLOP CIRCUIT OEVICE INCLUOING MERGEO BIPOLAR AND FIELD EFFECT TRANSISTORS

NIPPON TELEGRAPH AND TELEPHONE PUBLIC CORPORATION
- 3768081 - MINORITY CARRIER STORAGE ORIVE HAVING SINGLE TRANSISTOR CELL
- 4228525 - SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE
- 4231108 - SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE
- 4288862 - MEMORY CIRCUIT

NITRON CORPORATION/MCOONNELL-OOUGLAS CORPORATION
- 4057821 - NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE

OWENS-CORNING FIBERGLAS CORPORATION
- 3467947 - CONTROL APPARATUS
- 3641514 - MEMORY SYSTEM

PIONEER EDUCATIONAL SOCIETY
- 3906481 - TRANSISTOR NETWORK FOR INFORMATION STORAGE AND RETRIEVAL

PLESSEY COMPANY LIMITED
- 3623036 - OATA STORAGE ARRANGEMENTS

PLESSEY HANOEL UND INVESTMENTS AG
- 3774087 - MEMORY ELEMENTS
- 4064494 - CONTENT ADDRESSABLE MEMORIES
- 4090259 - MEANS FOR CONTROLLING THE GATE POTENTIAL OF MNOS TRANSISTORS IN A MEMORY

RAYTHEON COMPANY
- 3499158 - CIRCUITS UTILIZING THE THRESHOLO PROPERTIES OF RECOMBINATION RAOIATION SEMICONDUCTOR OEVICES
- 3761898 - RANDOM ACCESS MEMORY
- 3979612 - V-GROOVE ISOLATEO INTEGRATEO CIRCUIT MEMORY WITH INTEGRAL PINCHEO RESISTORS
- 4057788 - SEMICONDUCTOR MEMORY STRUCTURES

RCA CORPORATION
- 3423654 - BISTABLE FERROELECTRIC FIELO EFFECT OEVICE
- 3435138 - SOLIO STATE IMAGE PICKUP OEVICE UTILIZING INSULATEO GATE FIELD EFFECT TRANSISTORS
- 3440444 - ORIVER-SENSE CIRCUIT ARRANGEMENT
- 3493785 - BISTABLE CIRCUITS
- 3493786 - UNBALANCEO MEMORY CELL

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

RCA CORPORATION (CONTINUEO)

3521242 - COMPLEMENTARY TRANSISTOR WRITE ANO NORO FOR MEMORY CELL
3521244 - ELECTRICAL CIRCUIT FOR PROCESSING PERIOOIC SIGNAL PULSES
3529294 - INFORMATION SWITCHING ANO STORAGE CIRCUITRY
3533087 - MEMORY EMPLOYING TRANSISTOR STORAGE CELLS
3549911 - VARIABLE THRESHOLO LEVEL FIELO EFFECT MEMORY OEVICE
3551900 - INFORMATION STORAGE ANO OECOOER SYSTEM
3575617 - FIELO EFFECT TRANSISTOR, CONTENT AOORESSEO MEMORY CELL
3577166 - C-MOS OYNAMIC BINARY COUNTER
3599184 - STORAGE CIRCUIT
3617823 - SELF-SCANNEO PHOTOTRANSISTOR ARRAY EMPLOYING COMMON SUBSTRATE
3624419 - BALANCEO
3629612 - OPERATION OF FIELO-EFFECT TRANSISTOR CIRCUIT HAVING SUBSTANTIAL DISTRIBUTEO CAPACITANCE
3631411 - ELECTRICALLY ANO OPTICALLY ACCESSIBLE MEMORY
3636527 - STORAGE CIRCUIT
3638039 - OPERATION OF FIELO-EFFECT TRANSISTOR CIRCUITS HAVING SUBSTANTIAL OISTRIBUTEO CAPACITANCE
3649848 - VOLTAGE TRANSLATION CIRCUIT FOR MNOS MEMORY ARRAY
3656121 - ELECTRICALLY ANO OPTICALLY ACCESSIBLE MEMORY
3688264 - OPERATION OF FIELO-EFFECT TRANSISTOR CIRCUITS HAVING SUBSTANTIAL OISTRIBUTEO CAPACITANCE
3696250 - SIGNAL TRANSFER SYSTEM FOR PANEL TYPE IMAGE SENSOR
3702990 - VARIABLE THRESHOLO MEMORY SYSTEM USING MINIMUM AMPLITUOE SIGNALS
3713111 - OPERATION OF MEMORY ARRAY EMPLOYING VARIABLE THRESHOLD TRANSISTORS
3720922 - CHARGE COUPLEO MEMORY
3720925 - MEMORY SYSTEM USING VARIABLE THRESHOLD TRANSISTORS
3742464 - ELECTRICALLY ANO OPTICALLY ACCESSIBLE MEMORY
3753247 - ARRAY OF OEVICES RESPONSIVE TO OIFFERENTIAL LIGHT SIGNALS
3760378 - SEMICONOUCTOR MEMORY USING VARIABLE THRESHOLO TRANSISTORS
3763480 - OIGITAL ANO ANALOG OATA HANOLING OEVICES
3781830 - HOLOGRAPHIC MEMORY WITH LIGHT INTENSITY COMPENSATION MEANS
3958210 - CHARGE COUPLEO OEVICE SYSTEMS
3964031 - MEMORY CELL
3967254 - CHARGE TRANSFER MEMORY
3971003 - CHARGE COUPLEO OEVICE IMAGER
3971004 - MEMORY CELL WITH OECOUPLEO SUPPLY VOLTAGE WHILE WRITING
3979735 - INFORMATION STORAGE CIRCUIT
3986176 - CHARGE TRANSFER MEMORIES
4005436 - APPARATUS FOR MAKING A RECORDING OF AN ELECTROSTATIC CHARGE PATTERN
4009473 - CHARGE COUPLEO MEMORY SYSTEM
4010485 - CHARGE-COUPLEO OEVICE INPUT CIRCUITS
4016550 - CHARGE TRANSFER REAOOUT OF CHARGE INJECTION OEVICE ARRAYS
4032903 - CHARGE INJECTION OEVICE ARRAYS
4055836 - CHARGE TRANSFER REAOOUT CIRCUITS
4063225 - MEMORY CELL ANO ARRAY
4075690 - WRITE ENHANCEMENT CIRCUIT
4095281 - RANOOM ACCESS-ERASABLE REAO ONLY MEMORY CELL
4096401 - SENSE CIRCUIT FOR AN MNOS ARRAY USING A PAIR OF CMOS INVERTERS CROSS-COUPLEO VIA CMOS GATES WHICH ARE RESPONSIVE TO THE INPUT SENSE SIGNALS
4103185 - MEMORY CELLS
4114055 - UNBALANCEO SENSE CIRCUIT
4178614 - REAOOUT OF A OENSELY PACKEO CCO
4185319 - NON-VOLATILE MEMORY OEVICE
4189782 - MEMORY ORGANIZATION
4199691 - CCO MULTIPLE CHANNEL NETWORK
4208730 - PRECHARGE CIRCUIT FOR MEMORY ARRAY
4211936 - CCO GATE ELECTROOE STRUCTURES ANO SYSTEMS EMPLOYING THE SAME
4237472 - HIGH PERFORMANCE ELECTRICALLY ALTERABLE REAO ONLY MEMORY (EAROM)

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

RCA CORPORATION (CONTINUEO)
4242738 - LOOK AHEAO HIGH SPEEO CIRCUITRY
4247861 - HIGH PERFORMANCE ELECTRICALLY ALTERABLE REAO-ONLY MEMORY (EAROM)
4253162 - BLOCKEO SOURCE NOOE FIELO-EFFECT CIRCUITRY
4281400 - CIRCUIT FOR REOUCING THE LOAOING EFFECT OF AN INSULATEO-GATE FIELO-EFFECT TRANSISTOR (IGFET) ON A SIGNAL SOURCE
4313106 - ELECTRICALLY PROGRAMMABLE LOGIC ARRAY
4323910 - MNOS MEMORY TRANSISTOR

RESEARCH CORPORATION
3522590 - NEGATIVE RESISTANCE SANOWICH STRUCTURE MEMORY OEVICE

ROCKWELL INTERNATIONAL CORPORATION
3506851 - MOS TRANSISTOR ORIVER USING CAPACITIVE FEEOBACK
3576571 - MEMORY CIRCUIT USING STORAGE CAPACITANCE ANO FIELO EFFECT OEVICES
3582909 - RATIOLESS MEMORY CIRCUIT USING CONOITIONALLY SWITCHEO CAPACITOR
3671948 - REAO-ONLY MEMORY
3699539 - BOOTSTRAPPEO INVERTER MEMORY CELL
3721963 - PHOTON TO OIGITAL CONVERTER USING PHOTON FLUX INTEGRATION
3728696 - HIGH OENSITY REAO-ONLY MEMORY
3744037 - TWO-CLOCK MEMORY CELL
3855583 - CONOUCTOR-INSULATOR-JUNCTION (CIJ) OPTICAL MEMORY OEVICE ANO A MEMORY SYSTEM OEPENOENT THEREON
3924247 - ORIVER CELL WITH MEMORY ANO SHIFT CAPABILITY
3990056 - HIGH SPEEO MEMORY CELL
3992703 - MEMORY OUTPUT CIRCUIT
4091461 - HIGH-SPEEO MEMORY CELL WITH OUAL PURPOSE OATA BUS
4130892 - RAOIATION HARO MEMORY CELL ANO ARRAY THEREOF
4257111 - OIGITAL-TO-ANALOG OPTICAL RECOROER
4274147 - STATIC REAO ONLY MEMORY

ROLM CORPORATION
3813653 - MEMORY CELL WITH REOUCEO VOLTAGE SUPPLY WHILE WRITING

SANYO ELECTRIC CO., LTO.
4004159 - ELECTRICALLY REPROGRAMMABLE NONVOLATILE FLOATING GATE SEMI-CONOUCTOR MEMORY OEVICE AND METHOO OF OPERATION
4200841 - PRESET TUNING APPARATUS USING FLOATING GATE TYPE FIELO EFFECT OEVICE

SEEBURG CORPORATION
3548387 - BONUS CREOITING SYSTEM

SEMICONOUCTORS ELECTRONIC MEMORIES, INCORPORATEO
3631309 - INTEGRATEO CIRCUIT BIPOLAR MEMORY CELL
3636377 - BIPOLAR SEMICONOUCTOR RANOOM ACCESS MEMORY

SEMI, INC.
3936810 - SENSE LINE BALANCING CIRCUIT
3959782 - MOS CIRCUIT RECOVERY TIME

SHARP KABUSHIKI KAISHA
4112506 - RANOOM ACCESS MEMORY USING COMPLEMENTARY FIELO EFFECT OEVICES

SHELL OIL COMPANY
3550097 - OC MEMORY ARRAY
3614753 - SINGLE-RAIL SOLIO STATE MEMORY WITH CAPACITIVE STORAGE
3636528 - HALF BIT MEMORY CELL ARRAY WITH NONOESTRUCTIVE REAOOUT
3678473 - REAO-WRITE CIRCUIT FOR CAPACITIVE MEMORY ARRAYS
3699537 - SINGLE-RAIL MOSFET MEMORY WITH CAPACITIVE STORAGE

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

SIEMENS AKTIENGESELLSCHAFT
3426255 - FIELD EFFECT TRANSISTOR WITH A FERROELECTRIC CONTROL GATE LAYER
3729721 - CIRCUIT ARRANGEMENT FOR READING AND WRITING IN A BIPOLAR SEMICONDUCTOR MEMORY
3747077 - SEMICONDUCTOR MEMORY
3765002 - ACCELERATED BIT-LINE DISCHARGE OF A MOSFET MEMORY
3774170 - FIXEO DATA MEMORY UTILIZING SCHOTTKY DIODES
3781825 - PROGRAMMABLE FIXED DATA MEMORY UTILIZING SCHDTTKY DIODES
3810125 - INTEGRATED CIRCUIT ELECTRICAL CAPACITOR, PARTICULARLY AS A STORAGE ELEMENT FOR SEMICONDUCTOR MEMORIES
3936811 - ASSOCIATIVE STORAGE CIRCUIT
3949384 - SYNCHRONOUS SHIFT REGISTER WITH SERIES AND PARALLEL DATA INPUT AND BASIC POSITION INPUT
3968479 - COMPLEMENTARY STORAGE ELEMENT
3975718 - SEMICONDUCTOR ARRANGEMENT, PARTICULARLY A STORAGE ARRANGEMENT WITH FIELO EFFECT TRANSISTORS, AND METHOD OF OPERATING THE SAME
3997881 - STATIC STORAGE ELEMENT CIRCUIT
3999166 - STATIC SEMICONOUCTOR STORAGE ELEMENT
4000427 - STATIC THREE-TRANSISTOR-STORAGE ELEMENT
4005393 - BIPOLAR SEMICONDUCTOR MEMORY WITH RECHARGING CIRCUIT FOR CAPACITIVELY LOADED LINES
4021787 - INFORMATION STORAGE CIRCUIT EMPLOYING MNOS TRANSISTORS
4027294 - COMPENSATION ELEMENT FOR DYNAMIC SEMICONDUCTOR STORES, AND METHOD OF OPERATING THE SAME
4030081 - DYNAMIC TRANSISTOR-STORAGE ELEMENT
4035782 - CHARGE COUPLED OEVICE CIRCUIT FOR USE WITH A SEMICONDUCTOR STORAGE UNIT OR A SEMICONDUCTOR LOGICAL UNIT
4037218 - READ ONLY MEMORY MODULE
4055837 - DYNAMIC SINGLE-TRANSISTOR MEMORY ELEMENT FOR RELATIVELY PERMANENT MEMORIES
4063224 - CIRCUIT FOR THE PRODUCTION OF READ-OUT PULSES
4064491 - INFORMATION MEMORY FOR STORING INFORMATION IN THE FORM OF ELECTRIC CHARGE CARRIERS AND METHOD OF OPERATING THEREOF
4067001 - LINE FOR TRANSPORTING CHARGES FROM STORAGE ELEMENTS IN A STORAGE FIELO
4087795 - MEMORY FIELD EFFECT STORAGE DEVICE
4094009 - STORAGE ARRANGEMENT WITH MODULES CONSISTING OF CCO STORES
4099162 - OECODER CIRCUIT
4109270 - SEMICONDUCTOR STORE
4112513 - METHOD FOR REFRESHING STORAGE CONTENTS OF MOS MEMORIES
4134033 - FAST-SWITCHING OIGITAL DIFFERENTIAL AMPLIFIER SYSTEM FOR CCO ARRANGEMENTS
4136401 - STORAGE MODULE
4144588 - CCD STORAGE MOOULE
4148044 - N-CHANNEL MEMORY FIELO EFFECT TRANSISTOR
4150389 - N-CHANNEL MEMORY FIELD EFFECT TRANSISTOR
4156289 - SEMICONDUCTOR MEMORY
4161039 - N-CHANNEL STORAGE FET
4163242 - MOS STORAGE INTEGRATED CIRCUIT USING INDIVIDUAL FET ELEMENTS
4164040 - CCD STORAGE MODULE
4168538 - MONOLITHICALLY INTEGRATED SEMICONDUCTOR STORE
4168540 - REGISTER BUILDING BLOCK WITH SERIES CONNECTED CELLS TO SAVE OISSIPATION LOSS
4169291 - EPROM USING A V-MOS FLOATING GATE MEMORY CELL
4209849 - NON-VOLATILE MEMORY WHICH CAN BE ERASED WORD BY WORD CONSTRUCTED IN THE FLOATING GATE TECHNIQUE
4241422 - SERIES-PARALLEL-SERIES CHARGE TRANSFER MEMORY HAVING COMPLETE BIAS CHARGE OPERATION
4242603 - DYNAMIC STORAGE ELEMENT
4244035 - HIGHLY INTEGRATEO OYNAMIC MEMORY ELEMENT
4253034 - INTEGRATABLE SEMI-CONOUCTOR MEMORY CELL
4323913 - INTEGRATED SEMICONDUCTOR CIRCUIT ARRANGEMENT
4330850 - MNOS MEMORY CELL
4336557 - MONOLITHICALLY INTEGRATED CIRCUIT FOR RELATIVELY SLOW READOUT FROM A TWO-DIMENSIONAL IMAGE SENSOR
4336604 - MONOLITHIC STATIC MEMORY CELL

SIGNETICS CORPORATION
3654623 - BINARY MEMORY CIRCUIT WITH COUPLEO SHORT TERM AND LONG TERM STORAGE MEANS
3931617 - COLLECTOR-UP OYNAMIC MEMORY CELL

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

SIGNETICS CORPORATION (CONTINUEO)
- 3953866 - CROSS COUPLEO SEMICONOUCTOR MEMORY CELL
- 4112511 - FOUR TRANSISTOR STATIC BIPOLAR MEMORY CELL USING MERGEO TRANSISTORS
- 4122540 - MASSIVE MONOLITHIC INTEGRATEO CIRCUIT
- 4233674 - METHOO OF CONFIGURING AN INTEGRATEO CIRCUIT

SINGER COMPANY
- 3812479 - REAO-ONLY-MEMORY WITH REOIATION SET THESHOLO VOLTAGE
- 3925767 - RAOIATION SET THERMALLY RESET REAO-ONLY-MEMORY

SONY CORPORATION
- 3694704 - SEMICONOUCTOR OEVICE
- 3875567 - MEMORY CIRCUIT USING VARIABLE THRESHOLO LEVEL FIELO-EFFECT DEVICE
- 3883856 - PROGRAM INPUT SYSTEM USING A MEMORY CASSETTE
- 3919699 - MEMORY CIRCUIT
- 3971055 - ANALOG MEMORY CIRCUIT UTILIZING A FIELO EFFECT TRANSISTOR FOR SIGNAL STORAGE

SPERRY CORPORATION
- 3423646 - COMPUTER LOGIC OEVICE CONSISTING OF AN ARRAY OF TUNNELING OIOOES, ISOLATORS ANO SHORT CIRCUITS
- 3427601 - OETECTOR SYSTEM ANO OEVICE
- 3504350 - FLIP-FLOP MEMORY WITH MINIMIZEO INTER- CONNECTION WIRING
- 3508211 - ELECTRICALLY ALTERABLE NON-OESTRUCTIVE REAOOUT FIELO EFFECT TRANSISTOR MEMORY
- 3553659 - BIEMITTER TRANSISTOR SEARCH MEMORY ARRAY
- 3579204 - VARIABLE CONOUCTION THRESHOLO TRANSISTOR MEMORY CIRCUIT INSENSITIVE TO THRESHOLO OEVIATIONS
- 3618051 - NON-VOLATILE REAO-WRITE MEMORY WITH AOORESSING
- 3623023 - VARIABLE THRESHOLO TRANSISTOR MEMORY USING PULSE COINCIOENT WRITING
- 3624618 - HIGH-SPEEO MEMORY ARRAY USING VARIABLE THRESHOLO TRANSISTORS
- 3648258 - OPTICAL MEMORY CIRCUIT
- 3691535 - SOLIO STATE MEMORY ARRAY
- 3706976 - THREE-OIMENSIONAL SELECTION TECHNIQUE FOR VARIABLE THRESHOLO INSULATEO GATE FIELO EFFECT TRANSISTOR MEMORIES
- 3719932 - BIT ORGANIZED INTEGRATEO MNOS MEMORY CIRCUIT WITH OYNAMIC DECOOING ANO STORE-RESTORE CIRCUITRY
- 3747072 - INTEGRATEO STATIC MNOS MEMORY CIRCUIT
- 3824564 - INTEGRATEO THRESHOLO MNOS MEMORY WITH OECOOER AND OPERATING SEQUENCE
- 3829886 - BISTABLE SEMICONOUCTOR TEMPERATURE SENSOR
- 3831185 - CONTROLLEO INVERSION BISTABLE SWITCHING OIOOE
- 3831186 - CONTROLLEO INVERSION BISTABLE SWITCHING OIOOE OEVICE EMPLOYING BARRIER EMITTERS
- 3886532 - INTEGRATEO FOUR-PHASE OIGITAL MEMORY CIRCUIT WITH OECOOERS
- 3898632 - SEMICONOUCTOR BLOCK-ORIENTEO REAO/WRITE MEMORY
- 3906461 - INTEGRATEO MNOS MEMORY WITH OECOOER
- 3971001 - REPROGRAMMABLE REAO ONLY VARIABLE THRESHOLO TRANSISTOR MEMORY WITH ISOLATEO AOORESSING BUFFER
- 3979613 - MULTI-TERMINAL CONTROLLEO-INVERSION SEMICONOUCTOR OEVICES
- 4085460 - OECOOER BUFFER CIRCUIT FOR MNOS MEMORY
- 4099264 - NON-OESTRUCTIVE INTERROGATION CONTROL CIRCUIT FOR A VARIABLE THRESHOLO FET MEMORY
- 4122545 - MEMORY ARRAY OF INVERSION CONTROLLEO SWITCHES
- 4127901 - MNOS FET MEMORY RETENTION CHARACTERIZATION TEST CIRCUIT
- 4130897 - MNOS FET MEMORY RETENTION CHARACTERIZATION TEST CIRCUIT WITH ENHANCEO SENSITIVITY ANO POWER CONSERVATION
- 4141081 - MNOS BORAM SENSE AMPLIFIER/LATCH
- 4142112 - SINGLE ACTIVE ELEMENT CONTROLLEO-INVERSION SEMICONOUCTOR STORAGE CELL DEVICES ANO STORAGE MATRICES EMPLOYING SAME

SPRAGUE ELECTRIC COMPANY
- 3818462 - NOISE IMMUNE I.C. MEMORY CELL

STANOARO MICROSYSTEMS CORPORATION
- 4045783 - MOS ONE TRANSISTOR CELL RAM HAVING OIVIOEO ANO BALANCEO BIT LINES, COUPLEO BY REGENERATIVE FLIP-FLOP SENSE AMPLIFIERS, A NO BALANCEO ACCESS CIRCUITRY

DRGANIZATIDNAL PATENTING (1/69- 6/82) - - ALPHA LISTING

STANFDRO UNIVERSITY
4233671 - REAO DNLY MEMDRY ANO INTEGRATEO CIRCUIT ANO METHOO OF PRDGRAMMING BY LASER MEANS

TELEDYNE INOUSTRIES, INC.
3611319 - ELECTRICALLY ALTERABLE REAO DNLY MEMORY

TELETYPE CDRPDRATION
3618050 - READ-ONLY MEMORY ARRAYS IN WHICH A PDRTIDN DF THE MEMORY AOORESSING CIRCUITRY IS INTEGRAL TO THE ARRAY
4004284 - BINARY VOLTAGE-DIFFERENTIAL SENSING CIRCUITS, AND SENSE/REFRESH AMPLIFIER CIRCUITS FOR RANOOM-ACCESS MEMORIES
4031524 - REAO-DNLY MEMORIES, ANO REAODUT CIRCUITS THEREFOR

TEXAS INSTRUMENTS, INCDRPDRATED
3430203 - TRAINABLE DECISION SYSTEM UTILIZING METAL-OXIOE- SEMICONOUCTOR FIELD EFFECT TRANSISTDRS
3436738 - PLURAL EMITTER TYPE ACTIVE ELEMENT MEMORY
3441914 - HIGH FREQUENCY BINARY MEMDRY ANO LDGIC CIRCUIT
3484932 - METHOO OF MAKING INTEGRATED CIRCUITS
3573754 - INFDRMATION TRANSFER SYSTEM
3611320 - LIGHT BEAM INFORMATION STORAGE SYSTEM
3623027 - SOLID STATE LIGHT SENSITIVE STDRAGE OEVICE
3634833 - ASSOCIATIVE MEMORY CIRCUIT
3706975 - HIGH SPEEO MOS RANDDM ACCESS MEMORY
3740731 - ONE TRANSISTDR OYNAMIC MEMORY CELL
3740732 - OYNAMIC DATA STORAGE CELL
3771149 - CHARGE CDUPLED OPTICAL SCANNER
3792465 - CHARGE TRANSFER SDLID STATE OISPLAY
3852800 - DNE TRANSISTOR DYNAMIC MEMORY CELL
3864550 - CHARGE CDUPLEO DEVICE
3882469 - NON-VDLATILE VARIABLE THRESHOLD MEMORY CELL
3886531 - SCHOTTKY LOADEO EMITTER CDUPLEO MEMORY CELL FOR RANODM ACCESS MEMDRY
3889245 - METAL-INSULATDR-SEMICDNOUCTDR CDMPATIBLE CHARGE TRANSFER DEVICE MEMDRY SYSTEM
3914748 - ISOLATIDN-ELEMENT CCD SERIAL-PARALLEL-SERIAL ANALOG MEMORY
3916169 - CALCULATDR SYSTEM HAVING A PRECHARGEO VIRTUAL GROUND MEMORY
3934233 - READ-DNLY-MEMDRY FDR ELECTRONIC CALCULATOR
3940747 - HIGH DENSITY, HIGH SPEED RANODM ACCESS REAO-WRITE MEMORY
3941979 - READ DNLY MEMDRY
3953837 - DUAL SERIAL-PARALLEL-SERIAL ANALDG MEMORY
3986178 - INTEGRATEO INJECTIDN LOGIC RANOOM ACCESS MEMORY
4021781 - VIRTUAL GRDUNO READ-ONLY-MEMDRY FOR ELECTRDNIC CALCULATOR OR DIGITAL PROCESSDR
4028715 - USE DF FLOATING DIFFUSION FOR LDW-NOISE ELECTRICAL INPUTS IN CCO'S
4037217 - REAO-ONLY MEMORY USING COMPLEMENTARY CONOUCTIVITY TYPE INSULATED GATE FIELO EFFECT TRANSISTORS
4037242 - DUAL INJECTDR, FLOATING GATE MOS ELECTRICALLY ALTERABLE, NON-VOLATILE SEMICDNDUCTOR MEMORY OEVICE
4047163 - FAULT-TOLERANT CELL AOORESSABLE ARRAY
4059826 - SEMICONOUCTOR MEMORY ARRAY WITH FIELO EFFECT TRANSISTORS PROGRAMMABLE BY ALTERATIDN DF THRESHOLO VDLTAGE
4060738 - CHARGE COUPLEO OEVICE RANOOM ACCESS MEMORY
4070653 - RANDOM ACCESS MEMORY CELL WITH IDN IMPLANTEO RESISTDR ELEMENT
4072932 - CLOCK GENERATDR FDR SEMICONDUCTOR MEMORY
4082966 - MOS DETECTDR OR SENSING CIRCUIT
4092734 - ANALDGUE MEMDRY
4092735 - STATIC MEMDRY CELL USING FIELD IMPLANTED RESISTANCE
4103347 - ZIG-ZAG SPS CCD MEMDRY
4104732 - STATIC RAM CELL
4112509 - ELECTRICALLY ALTERABLE FLDATING GATE SEMICDNOUCTDR MEMORY OEVICE
4112575 - FABRICATION METHDOS FDR THE HIGH CAPACITY RAM CELL
4118795 - TWO-PHASE CCO REGENERATOR - I/O CIRCUITS
4122544 - ELECTRICALLY ALTERABLE FLDATING GATE SEMICDNOUCTDR MEMORY OEVICE WITH SERIES ENHANCEMENT TRANSISTOR
4139785 - STATIC MEMDRY CELL WITH INVERTED FIELO EFFECT TRANSISTOR

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

TEXAS INSTRUMENTS, INCORPDRATED (CONTINUED)

4139786 - STATIC MDS MEMORY CELL USING INVERTED N-CHANNEL FIELD-EFFECT TRANSISTDR
4142111 - DNE-TRANSISTDR FULLY STATIC SEMICONDUCTDR MEMDRY CELL
4151020 - HIGH DENSITY N-CHANNEL SILICON GATE READ DNLY MEMDRY
4151021 - METHDD OF MAKING A HIGH DENSITY FLOATING GATE ELECTRICALLY PROGRAMMABLE RDM
4152779 - MDS RAM CELL HAVING IMPRDVED REFRESH TIME
4164751 - HIGH CAPACITY DYNAMIC RAM CELL
4184207 - HIGH DENSITY FLOATING GATE ELECTRICALLY PROGRAMMABLE ROM
4184208 - PSEUDO-STATIC SEMICONDUCTDR MEMORY CELL
4198693 - VMDS READ DNLY MEMDRY
4198695 - STATIC SEMICONDUCTOR MEMORY CELL USING DATA LINES FOR VOLTAGE SUPPLY
4203125 - BURIED STORAGE PUNCH THRDUGH DYNAMIC RAM CELL
4207585 - SILICDN GATE MOS ROM
4208726 - PRDGRAMMING OF SEMICONDUCTOR READ ONLY MEMORY
4208727 - SEMICONDUCTDR READ ONLY MEMORY USING MOS DIODES
4209851 - SEMICONDUCTOR MEMDRY CELL WITH CLOCKED VDLTAGE SUPPLY FRDM DATA LINES
4212083 - MDS INTEGRATED WITH IMPLANTED RESISTDR ELEMENTS
4225945 - RANDOM ACCESS MDS MEMDRY CELL USING DDUBLE LEVEL PDLYSILICON
4236229 - SEMICONDUCTOR MEMORY CELL WITH SYNTHESIZED LOAD RESISTORS
4240092 - RANDOM ACCESS MEMORY CELL WITH DIFFERENT CAPACITOR AND TRANSISTOR OXIDE THICKNESS
4242737 - NDN-VOLATILE SEMICONDUCTOR MEMDRY ELEMENTS
4247915 - PUNCH-THRDUGH LDAD DEVICES IN HIGH DENSITY STATIC MEMDRY CELL
4247919 - LDW POWER QUASI-STATIC STDRAGE CELL
4271421 - HIGH DENSITY N-CHANNEL SILICON GATE READ ONLY MEMDRY
4282446 - HIGH DENSITY FLDATING GATE EPRDM PRDGRAMMABLE BY CHARGE STORAGE
4291391 - TAPER ISDLATED RANDDM ACCESS MEMORY ARRAY AND METHDD DF OPERATING
4301518 - DIFFERENTIAL SENSING OF SINGLE ENDED MEMORY ARRAY
4317273 - METHOD OF MAKING HIGH COUPLING RATIO DMDS ELECTRICALLY PRDGRAMMABLE ROM
4321695 - HIGH SPEED SERIAL ACCESS SEMICDNDUCTDR MEMDRY WITH FAULT TOLERANT FEATURE
4322824 - STATIC RANDOM ACCESS MEMDRY WITH MERGED BIT LINES
4326331 - HIGH CDUPLING RATID ELECTRICALLY PRDGRAMMABLE ROM
4330851 - DYNAMIC DECODER INPUT FOR SEMICDNDUCTOR MEMDRY
4334293 - SEMICONDUCTDR MEMDRY CELL WITH CLOCKED VOLTAGE SUPPLY FRDM DATA LINES
4335391 - NON-VDLATILE SEMICONDUCTOR MEMDRY ELEMENTS AND METHDDS OF MAKING

THOMSON-CSF

3953836 - ACOUSTIC STORAGE DEVICE FOR HIGH-FREQUENCY ELECTRICAL SIGNALS
3955182 - TRANSISTORISED MEMDRY CELL AND AN INTEGRATED MEMDRY USING SUCH A CELL
3986177 - SEMICONDUCTOR STORE ELEMENT AND STORES FDRMED BY MATRICES OF SUCH ELEMENTS
4110839 - NON-VDLATILE LONG MEMORY FDR FAST SIGNALS
4122543 - NON-VDLATILE MEMDRY FDR FAST SIGNALS
4143421 - TETRODE TRANSISTOR MEMORY LOGIC CELL
4215424 - DESCRIPTIVE RESUME RANDOM ACCESS STATIC MEMDRY ELEMENT
4264964 - DYNAMIC MEMORY CELL OF THE CHARGE TRANSFER TYPE APPLICABLE IN PARTICULAR TO A SHIFT REGISTER

TOKD, INC.

3704457 - DRIVING TECHNIQUE FOR THIN FILM MEMORY ELEMENTS

TOKYD SHIBAURA ELECTRIC CO., LTD.

3787823 - LIGHT CONTROLLABLE CHARGE TRANSFER DEVICE
3831155 - NDNVDLATILE SEMICONDUCTOR SHIFT REGISTER
3866186 - LOGIC CIRCUIT ARRANGEMENT EMPLOYING INSULATED GATE FIELD EFFECT TRANSISTDRS
3909806 - ANALDGUE MEMDRY DEVICE
3947829 - LOGICAL CIRCUIT APPARATUS
3950737 - NDNVDLATILE COUNTER CIRCUIT
3976984 - LEVEL SHIFTING CIRCUIT DEVICE

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

TOKYO SHIBAURA ELECTRIC CO., LTO. (CONTINUED)
- 4019198 - NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE
- 4044342 - DYNAMIC TYPE SEMICONDUCTOR MEMORY DEVICE
- 4044343 - NON-VOLATILE RANDOM ACCESS MEMORY SYSTEM
- 4085459 - MULTIVALUED OATA MEMORY SYSTEM USING A CHARGE COUPLED ELEMENT
- 4093942 - MATRIX CIRCUITS
- 4115795 - SEMICONDUCTOR MEMORY OEVICE
- 4122541 - NON-VOLATILE MEMORY OEVICE
- 4123771 - NONVOLATILE SEMICONDUCTOR MEMORY
- 4131906 - OYNAMIC RANDOM ACCESS MEMORY USING MOS FETS AND METHOD FOR MANUFACTURING SAME
- 4131951 - HIGH SPEED COMPLEMENTARY MOS MEMORY
- 4144587 - COUNTING LEVEL +37 1+38 +O BITS TO MINIMIZE ROM ACTIVE ELEMENTS
- 4151610 - HIGH DENSITY SEMICONDUCTOR MEMORY OEVICE FORMEO IN A WELL AND HAVING MORE THAN ONE CAPACITOR
- 4168537 - NONVOLATILE MEMORY SYSTEM ENABLING NONVOLATILE OATA TRANSFER OURING POWER ON
- 4193125 - READ ONLY MEMORY
- 4204277 - OYNAMIC READ-WRITE RANDOM ACCESS MEMORY
- 4211937 - MULTI-CHANNEL CHARGE COUPLED TRANSFER OEVICE
- 4215357 - CHARGE TRANSFER OEVICE STORED WITH FIXED INFORMATION
- 4223333 - CHARGE PUMPING SEMICONDUCTOR MEMORY
- 4233672 - HIGH-SPEED SEMICONDUCTOR DEVICE
- 4236228 - MEMORY DEVICE FOR PROCESSING PICTURE IMAGES DATA
- 4247918 - ELECTRICALLY ALTERABLE NONVOLATILE MEMORY
- 4270188 - NONVOLATILE SEMICONDUCTOR MEMORY APPARATUS
- 4287574 - MEMORY CELL WITH NON-VOLATILE MEMORY ELEMENTS

TRW INC.
- 4135104 - REGENERATOR CIRCUIT

ULTRA ELECTRONICS LIMITED
- 3836893 - CAPACITIVE COMPUTER CIRCUITS

UNITED INDUSTRIAL SYNDICATE, INC. D/B/A
- 3599181 - SOLID STATE COMPUTER MEMORY OEVICE

UNITEO STATES OF AMERICA, AIR FORCE
- 3965462 - SERPENTINE CHARGE-COUPLED-DEVICE MEMORY CIRCUIT
- 4070655 - VIRTUALLY NONVOLATILE STATIC RANOOM ACCESS MEMORY DEVICE
- 4091460 - QUASI STATIC, VIRTUALLY NONVOLATILE RANDOM ACCESS MEMORY CELL
- 4163985 - NONVOLATILE PUNCH THROUGH MEMORY CELL WITH BURIED N+3O +O REGION IN CHANNEL
- 4208729 - AUTOMATIC DATA RESTORE APPARATUS FOR MNOS TEMPORARY STORE MEMORY

UNITEO STATES OF AMERICA, ARMY
- 3585611 - FERROELECTRIC SEMICONDUCTOR MEMORY ELEMENT
- 3588848 - INPUT-OUTPUT-CONTROL CIRCUIT FOR MEMORY CIRCUIT
- 3914600 - ELECTRON IMAGE INTEGRATION INTENSIFIER TUBE
- 3914750 - MNOS MEMORY MATRIX WITH SHIFT REGISTER INPUT AND OUTPUT
- 3918032 - AMORPHOUS SEMICONDUCTOR SWITCH AND MEMORY WITH A CRYSTALLIZATION-ACCELERATING LAYER
- 3947852 - ELECTRON IMAGE RECORDER WITH SEMICONDUCTIVE IMAGE INTENSIFIER
- 4126901 - PHOTOVOLTAIC-FERROELECTRIC CORRELATION DEVICES
- 4144591 - MEMORY TRANSISTOR

UNITEO STATES OF AMERICA, NATIONAL AERONAUTICS ANO SPACE AOM
- 3906296 - STOREO CHARGE TRANSISTOR

UNITED STATES OF AMERICA, NAVY
- 3952290 - READ-ONLY OPTICAL MEMORY SYSTEM

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

UNITED STATES OF AMERICA, NAVY (CONTINUED)
- 4028565 - SEMICONDUCTOR VISIBLE IMAGE STORAGE DEVICE
- 4156286 - SOLID STATE DATA RECORDER
- 4164023 - PERMUTATION MEMORIES

UNIVERSITY OF CALIFORNIA, THE REGENTS OF
- 3528064 - SEMICONDUCTOR MEMORY ELEMENT AND METHOD

U.S. PHILIPS CORPORATION
- 3525083 - INTEGRATED CIRCUIT READING STORE MATRICES
- 3540011 - SOLID STATE RADIATION IMAGERS
- 3656010 - TRANSISTORIZED MASTER SLAVE FLIP-FLOP CIRCUIT
- 3671946 - BINARY STORAGE CIRCUIT ARRANGEMENT
- 3704456 - ASSOCIATIVE STORAGE ELEMENT
- 3739371 - CROSS ADDRESSED BISTABLE DISPLAY PANEL WITH SELECTABLE BILEVEL SUSTAINING BIAS CIRCUIT
- 3761900 - CAPACITIVE MATRIX STORE
- 3787822 - METHOD OF PROVIDING INTERNAL CONNECTIONS IN A SEMICONDUCTOR DEVICE
- 3918070 - SEMICONDUCTOR DEVICES
- 3952325 - SEMICONDUCTOR MEMORY ELEMENTS
- 3976983 - BIPOLAR PROGRAMMABLE READ ONLY MEMORY WITH FUSIBLE LINKS
- 4019197 - SEMICONDUCTOR FLOATING GATE STORAGE DEVICE WITH LATERAL ELECTRODE SYSTEM
- 4031523 - INTEGRATED STORAGE SYSTEM WITH PARALLEL CONNECTION LINES CONTAINING A RESISTOR
- 4039860 - AMPLIFIER ARRANGEMENT FOR DETECTING LOGIC SIGNALS FROM A CAPACITANCE SOURCE
- 4056810 - INTEGRATED INJECTION LOGIC MEMORY CIRCUIT
- 4122542 - MEMORY ARRAY
- 4126899 - JUNCTION FIELD EFFECT TRANSISTOR RANDOM ACCESS MEMORY
- 4126900 - RANDOM ACCESS JUNCTION FIELD-EFFECT FLOATING GATE TRANSISTOR MEMORY
- 4131950 - CHARGE TRANSFER DEVICE
- 4229757 - PROGRAMMABLE MEMORY CELL HAVING SEMICONDUCTOR DIODES
- 4254427 - SEMICONDUCTOR DEVICE HAVING A COMPACT READ-ONLY MEMORY
- 4255674 - SEMICONDUCTOR DEVICE HAVING A MULTIPLE-EMITTER TRANSISTOR
- 4322821 - MEMORY CELL FOR A STATIC MEMORY AND STATIC MEMORY COMPRISING SUCH A CELL

VLSI TECHNOLOGY RESEARCH ASSOCIATION
- 4281399 - SEMICONDUCTOR MEMORY DEVICE

WESTINGHOUSE ELECTRIC CORP.
- 3590272 - MIS SOLID STATE MEMORY ELEMENTS UNITIZING STABLE AND REPRODUCIBLE CHARGES IN AN INSULATING LAYER
- 3618053 - TRAPPED CHARGE MEMORY CELL
- 3641511 - COMPLEMENTARY MOSFET INTEGRATED CIRCUIT MEMORY
- 3644907 - COMPLEMENTARY MOSFET MEMORY CELL
- 3680062 - RESETTALBE NON-VOLATILE MEMORY UTILIZING VARIABLE THRESHOLD VOLTAGE DEVICES
- 3683335 - NON-VOLATILE MEMORY ELEMENT AND ARRAY
- 3702465 - ELECTRO-OPTIC MASS MEMORY
- 3733591 - NON-VOLATILE MEMORY ELEMENT
- 3832700 - FERROELECTRIC MEMORY DEVICE
- 3836894 - MNOS/SOS RANDOM ACCESS MEMORY
- 3845327 - COUNTER WITH MEMORY UTILIZING MNOS MEMORY ELEMENTS
- 3845471 - CLASSIFICATION OF A SUBJECT
- 3882471 - APPARATUS AND METHOD OF OPERATING A HIGH-DENSITY MEMORY
- 3895360 - BLOCK ORIENTED RANDOM ACCESS MEMORY
- 3908182 - NON-VOLATILE MEMORY CELL
- 4034199 - PROGRAMMABLE ANALOG TRANSVERSAL FILTER
- 4041298 - FLOATING CLOCK SENSOR FOR BUFFERED, INDEPENDENT, NON-DESTRUCTIVE READOUT OF CHARGE TRANSFER DEVICES
- 4090257 - DUAL MODE MNOS MEMORY WITH PAIRED COLUMNS AND DIFFERENTIAL SENSE CIRCUIT
- 4090258 - MNOS NON-VOLATILE MEMORY WITH WRITE CYCLE SUPPRESSION

ORGANIZATIONAL PATENTING (1/69- 6/92) - - ALPHA LISTING

WESTINGHOUSE ELECTRIC CORP. (CONTINUED)
- 4095282 - MEMORY INCLUDING VARACTOR CIRCUIT TO BOOST ADDRESS SIGNALS
- 4103344 - METHOD AND APPARATUS FOR ADDRESSING A NON-VOLATILE MEMORY ARRAY
- 4103348 - VOLATILE AND NONVOLATILE RANDOM ACCESS MEMORY CELL
- 4112456 - STABILIZED CHARGE INJECTOR FOR CHARGE COUPLED DEVICES WITH MEANS FOR INCREASING THE SPEED OF PROPAGATION OF CHARGE CARRIERS
- 4112507 - ADDRESSABLE MNOS CELL FOR NON-VOLATILE MEMORIES
- 4124900 - MEMORY USING INTERLEAVED ROWS TO PERMIT CLOSER SPACING
- 4139911 - HIGH SPEED SENSE CIRCUIT FOR SEMICONDUCTOR MEMORIES
- 4149270 - VARIABLE THRESHOLD DEVICE MEMORY CIRCUIT HAVING AUTOMATIC REFRESH FEATURE
- 4161038 - COMPLEMENTARY METAL-FERROELECTRIC SEMICONDUCTOR TRANSISTOR STRUCTURE AND A MATRIX OF SUCH TRANSISTOR STRUCTURE FOR PERFORMING A COMPARISON
- 4170741 - HIGH SPEED CMOS SENSE CIRCUIT FOR SEMICONDUCTOR MEMORIES
- 4179626 - SENSE CIRCUIT FOR USE IN VARIABLE THRESHOLD TRANSISTOR MEMORY ARRAYS
- 4193128 - HIGH-DENSITY MEMORY WITH NON-VOLATILE STORAGE ARRAY
- 4233673 - ELECTRICALLY RESETTABLE NON-VOLATILE MEMORY FOR A FUSE SYSTEM

WESTON INSTRUMENTS INC.
- 3969705 - SPECTRUM ANALYZER HAVING MEANS FOR TRANSIENT SIGNAL ANALYSIS

XEROX CORPORATION
- 3437408 - MULTIPLE COPY ELECTROSTATIC IMAGING APPARATUS
- 3474417 - FIELD EFFECT SOLID STATE IMAGE PICKUP AND STORAGE DEVICE
- 3518698 - IMAGING SYSTEM
- 3539862 - DUAL CONDUCTOR STORAGE PANEL
- 3543031 - DEVICE AND PROCESS FOR IMAGE STORAGE
- 3543032 - DEVICE AND PROCESS FOR AMPLIFYING AND STORING AN IMAGE
- 3979586 - NON-CRYSTALLINE DEVICE MEMORY ARRAY
- 4077700 - WAVEGUIDE ADDRESSING AND MODULATING METHOD AND APPARATUS
- 4085455 - ELECTRICAL INFORMATION STORAGE SYSTEM
- 4133611 - TWO-PAGE INTERWEAVED RANDOM ACCESS MEMORY CONFIGURATION
- 4162538 - THIN FILM PROGRAMMABLE READ-ONLY MEMORY HAVING TRANSPOSABLE INPUT AND OUTPUT LINES
- 4162541 - APPARATUS FOR OVERSCRIBING BINARY DATA OF A SELECTED POLARITY INTO A SEMICONDUCTOR STORE

XICOR, INC.
- 4263664 - NONVOLATILE STATIC RANDOM ACCESS MEMORY SYSTEM
- 4274012 - SUBSTRATE COUPLED FLOATING GATE MEMORY CELL
- 4300212 - NONVOLATILE STATIC RANDOM ACCESS MEMORY DEVICES
- 4314265 - DENSE NONVOLATILE ELECTRICALLY-ALTERABLE MEMORY DEVICES WITH FOUR LAYER ELECTRODES

ZELLWEGER USTER AG
- 3848240 - STORAGE SWITCH ARRANGEMENT

INVENTORS OF INDIVIDUALLY OWNED PATENTS (1/75- 6/82) (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
BAKER	ROGER	T.	BOX 240	MOUNT TABOR	NJ	07878
4015247 - METHOD FOR OPERATING CHARGE TRANSFER MEMORY CELLS						
4074239 - MEMORY CELL WITH NONDESTRUCTIVE RECALL						
BAKER	ROGER	T.	P.O. BOX 240	MOUNT TABOR	NJ	07878
4056811 - CIRCUIT FOR THE IMPROVEMENT OF SEMICONDUCTOR MEMORIES						
BAKER	ROGER	T.	BOX 240	PARSIPPANY TROY HILL	NJ	07878
3997799 - SEMICONDUCTOR-DEVICE FOR THE STORAGE OF BINARY DATA						
BAKER	ROGER	THOMAS	BOX 240	MOUNT TABOR	NJ	07878
4062001 - DYNAMIC CONTENT ADDRESSABLE SEMICONDUCTOR MEMORY						
BAKER	ROGER	THOMAS	BOX 240	MT. TABOR	NJ	07878
4092736 - THREE ELECTRODE DYNAMIC SEMICONDUCTOR MEMORY CELL WITH COINCIDENT SELECTION						
4112510 - DYNAMIC MEMORY CELL WITH AUTOMATIC REFRESHING						
BANAVAR	JAYANTH	R.	5604 5TH AVE., +190 106	PITTSBURGH	PA	15232
4167791 - NON-VOLATILE INFORMATION STORAGE ARRAYS OF CRYOGENIC PIN DIODES						
ERB	DARRELL	M.	1100 RUNNYMEAD	LOS ALTOS	CA	94022
4158238 - STRATIFIED CHARGE RAM HAVING AN OPPOSITE DOPANT POLARITY MOSFET SWITCHING CIRCUIT						
ERB	DARRELL	M.	1100 RUNNYMEAD DR.	LOS ALTOS	CA	94022
4247916 - MEMORY DEVICE IN WHICH ONE TYPE CARRIER STORED DURING WRITE CONTROLS THE FLOW OF THE OTHER TYPE CARRIER DURING READ						
GEIER	KARL-HEINZ		2, STRASSE DER JARGENO	JENA		DT
3860915 - MATRIX ARRANGEMENT FOR OPERATING OPTICAL ELEMENTS						
HARARI	ELIYAHOU		2320 FRIARS LA.	LOS ALTOS	CA	94022
4316264 - UNIQUELY ACCESSED RAM						
4328565 - NON-VOLATILE EPROM WITH INCREASED EFFICIENCY						
HYATT	GILBERT	P.	P.O. BOX 4584	ANAHEIM	CA	92803
4209852 - SIGNAL PROCESSING AND MEMORY ARRANGEMENT						
INGEBRIGTSEN	KJELL	A.	EINAR OFSTIS VEI 27	7000 TRONDHEIM		NO
4066984 - SURFACE ACOUSTIC WAVE DEVICES FOR PROCESSING AND STORING SIGNALS						
KRUZHANOV	JURY	V.	103498, KORPUS 431, KV. 112	MOSCOW		SU
4195354 - SEMICONDUCTOR MATRIX FOR INTEGRATED READ-ONLY STORAGE						
LIN	HUNG	CHANG	8 SCHINDLER CT.	SILVER SPRING	MD	20903
3893152 - METAL NITRIDE OXIDE SEMICONDUCTOR INTEGRATED CIRCUIT STRUCTURE						
MCPHERSON	ROGER	K.	12707 MURPHY RD., LOT 68	STAFFORD	TX	77477
4322822 - HIGH DENSITY VMOS ELECTRICALLY PROGRAMMABLE ROM						
SCHMIDT	DIETMAR		BLOCK 9	JENA		DT
3860915 - MATRIX ARRANGEMENT FOR OPERATING OPTICAL ELEMENTS						
SCHUERMEYER	FRITZ	L.	1759 SOUTHVIEW	YELLOW SPRINGS	OH	45387
4064492 - VIRTUALLY NONVOLATILE RANDOM ACCESS MEMORY CELL						

INVENTORS OF INOIVIOUALLY OWNEO PATENTS (1/75- 6/82) (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
STERN	ERNEST		31 OXBOW ROAO	CONCORO	MA	O1742
4066984 - SURFACE ACOUSTIC WAVE OEVICES FOR PROCESSING ANO STORING SIGNALS						
UHLMANN	LOTHAR		BLOCK 37	JENA		OT
3860915 - MATRIX ARRANGEMENT FOR OPERATING OPTICAL ELEMENTS						
YOUNG	CHARLES	R.	241 CATO ORIVE	XENIA	OH	45385
4064492 - VIRTUALLY NONVOLATILE RANOOM ACCESS MEMORY CELL						

PATENTS (1/63- 6/82) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN THE OATA BASE

3431433 - OIGITAL STORAGE DEVICES USING FIELO-EFFECT TRANSISTOR BITABLE CIRCUITS
3450967 - SELENIUM MEMORY CELL CONTAINING SILVER UP TO 2 ATOMIC PERCENT AOJACENT THE RECTIFYING CONTACT
3492659 - ELECTRICAL RESISTANCE MEMORY
3501752 - PULSE-TYPE MAGNETIC CORE MEMORY ELEMENT CIRCUIT WITH BLOCKING OSCILLATOR FEEOBACK
3513365 - FIELO-EFFECT INTEGRATEO CIRCUIT AND METHOO OF FABRICATION
3573485 - COMPUTER MEMORY STORAGE OEVICE
3576548 - FIXEO MEMORY SYSTEM USING FIELO EFFECT OEVICES
3613055 - REAO-ONLY MEMORY UTILIZING SERVICE COLUMN SWITCHING TECHNIQUES
3643111 - MEMORY CIRCUIT
3673579 - ORAWINGBOARO II, A GRAPHICAL INPUT-OUTPUT OEVICE FOR A COMPUTER
3686644 - GATEO OIOOE MEMORY
3704455 - 3O-COAXIAL MEMORY CONSTRUCTION ANO METHOO OF MAKING
3764825 - ACTIVE ELEMENT MEMORY
3771145 - AOORESSING AN INTEGRATEO CIRCUIT REAO-ONLY MEMORY
3781553 - APPARATUS FOR ANALYZING AN IMAGE
3789372 - SELF TRACKING BEAM ACCESSIBLE MEMORY ANO AOORESSING METHOO THEREFOR
3814848 - PHOTOGRAPHIC TYPE FACE REPROOUCERS
3815106 - FLIP-FLOP MEMORY CELL ARRANGEMENT

3078353	3085233	3087123	3089038	3089126	3091754	3094687	3097312	3102207	3105957	3105958	3107345
3109163	3109934	3111592	3111610	3111649	3112408	3114135	3116427	3117013	3118130	3119985	3120653
3121173	3121186	3129418	3131378	3132264	3134963	3141097	3149311	3155833	3155947	3157857	3158841
3161859	3162842	3163851	3171042	3171100	3172088	3173130	3177373	3177374	3178590	3178592	3184605
3187310	3188485	3189876	3189877	3189878	3193685	3193804	3197653	3198958	3201595	3201598	3201764
3204044	3206730	3212066	3218613	3221157	3221180	3229253	3231763	3234521	3239821	3241009	3243602
3243787	3245051	3245052	3248565	3252150	3253232	3264624	3267440	3271591	3271746	3275846	3275996
3283318	3284644	3284677	3284782	3287659	3292008	3292014	3295031	3297950	3300624	3304442	3307169
3308282	3309534	3320592	3321746	3329832	3331058	3334336	3336518	3339185	3343143	3348214	3350610
3350652	3354440	3355289	3355720	3355721	3355725	3356858	3356998	3359368	3363115	3363240	3363241
3364362	3365707	3372284	3373295	3373406	3373419	3375502	3377513	3380037	3382115	3384879	3387286
3388386	3389383	3390311	3390382	3391395	3392376	3394356	3397325	3399390	3400383	3401294	3404450

SEMICONDUCTOR MEMORIES

Selected Patents

Semiconductor memories are generally divisable into three broad categories. These are archival or Read Only Memories (ROM's), Read/Write or Random Access Memories (RAM's), and Charge Coupled Devices (CCD's).

ROM's are used to store information which is relatively permanent such as the instruction set for a microprocessor. ROM's have traditionally been programmed by the manufacturer at the direction of the user, but the current trend is toward developing user programmable ROM's or PROM's and variations such as electrically alterable ROM's or EAROM's and electrically erasable programmable ROM's or EEPROM's.

RAM's are generally used for working storage in digital systems. In a RAM, any cell in the storage matrix is addressable to either write in or read out data. Thus, any data which changes during a digital operation or which is externally generated must generally be stored in a RAM.

CCD's are suitable for use in a serial access rather than random access system. In such a system, stored bits are cyclically moved past a read/write point, thus rendering each bit available only once per data cycle. Although they provide much slower access than a RAM, addressing is greatly simplified.

The following 10 patents were selected as being of particular interest in the field of semiconductor memories. The first two patents are efforts to improve the efficiency and the packing density, respectively, of a ROM. The third and fourth patents are directed to programming methods for ROM's, and the fifth is a design for an EEPROM. The sixth, seventh and eighth patents are concerned with the cell design of a particular RAM, while the ninth patent is directed to a RAM in which all memory cells in a row can be simultaneously reset. The tenth patent is an example of a CCD.

* * *

THE DISCLOSED INVENTION IS A FIELD EFFECT TRANSISTOR (FET) ROM CELL WHICH STORES MORE THAN ONE BIT. THE CHANNEL CONDUCTANCE OF THE FET IS VARIED TO PROVIDE AN ANALOG ELECTRICAL OUTPUT WHICH IS THEN CONVERTED TO A DIGITAL SIGNAL VIA A PLURALITY OF SENSE AMPLIFIERS. THE AMPLIFIERS ARE IN TURN CONNECTED TO A LOGIC ARRAY. THE INVENTION IS SIGNIFICANT SINCE A STORAGE OF 2 BITS PER CELL DOUBLES THE CAPACITY OF THE ROM WITHOUT A CORRESPONDING INCREASE IN THE SIZE OF THE MEMORY.

United States Patent [19]

Craycraft

[11] **4,192,014**

[45] **Mar. 4, 1980**

[54] **ROM MEMORY CELL WITH 2^n FET CHANNEL WIDTHS**

[75] Inventor: **Donald G. Craycraft**, Spring Valley, Ohio

[73] Assignee: **NCR Corporation**, Dayton, Ohio

[21] Appl. No.: **962,572**

[22] Filed: **Nov. 20, 1978**

[51] **Int. Cl.**[2] **G11C 17/00**

[52] **U.S. Cl.** **365/104**; 365/45

[58] **Field of Search** 365/94, 103, 104, 45, 365/184, 185

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,656,117	4/1972	Maley et al.	365/104
4,054,864	10/1977	Audaire et al.	365/184
4,085,459	4/1978	Hirabayashi	365/184

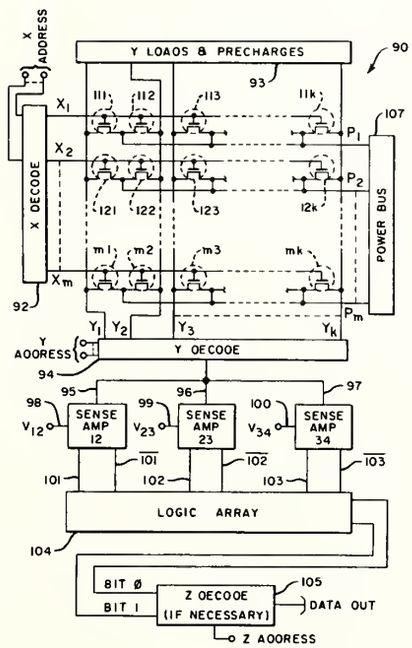
Primary Examiner—Stuart N. Hecker

Attorney, Agent, or Firm—J. T. Cavender; Philip A. Dalton

[57] **ABSTRACT**

An FET read-only memory cell capable of storing more than one bit per cell. The channel geometry of the FET cell is selected to provide an electrical output that is characteristic of a predetermined combination of bits. For example, the FET channel width can be selected to provide one of 2^n predetermined output voltage values which correspond to the 2^n possible arrangements of n bits. The read function utilizes 2^n-1 sense amplifiers, which are connected to the FET. Each sense amplifier is selectively activated at a separate one of 2^n-1 voltage levels which is intermediate two adjacent values of the 2^n output voltages. The collective outputs of the sense amplifiers drive a logic circuit for decoding the values of the n data bits represented by the FET channel width.

8 Claims, 10 Drawing Figures



AN EXTREMELY HIGH CELL DENSITY IS ACHIEVED IN THIS ROM BY USING VERTICAL WORD LINES HAVING ADDITIONAL CELLS ALONG WITH THE NORMAL HORIZONTAL WORD LINES. PRECHARGE CIRCUITS AND SENSE AMPLIFIERS ARE CONNECTED TO THE CELLS VIA FURTHER METALLIC LINES ARRANGED AT A 45° ANGLE WITH RESPECT TO BOTH THE VERTICAL AND HORIZONTAL WORD LINES.

United States Patent [19]

Chakravarti et al.

[11] **4,287,571**

[45] **Sep. 1, 1981**

[54] **HIGH DENSITY TRANSISTOR ARRAYS**

[75] Inventors: **Satya N. Chakravarti**, Troy, N.Y.; **John A. Hiltebeitel**, South Burlington, Vt.

[73] Assignee: **International Business Machines Corporation**, Armonk, N.Y.

[21] Appl. No.: **74,272**

[22] Filed: **Sep. 11, 1979**

[51] **Int. Cl.**³ **G11C 17/00**; G11C 11/40

[52] **U.S. Cl.** **365/104**; 365/184; 357/45

[58] **Field of Search** ..... 365/104, 184, 185; 357/45; 340/166 R

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,056,113	9/1962	Smith	
3,706,976	12/1972	Oleksiak	365/184
3,728,696	4/1973	Polkinghorn	365/104
3,851,317	11/1974	Kenyon	365/184
4,021,789	5/1977	Furman et al.	357/54
4,031,524	6/1977	Heeren	365/104
4,037,217	7/1977	Savarese	365/104
4,059,826	11/1977	Rogers	365/104
4,099,196	7/1978	Simko	365/185
4,161,039	7/1979	Rossler	365/185
4,180,826	12/1979	Shappir	365/104
4,184,207	1/1980	McElroy	365/104
4,193,125	3/1980	Moriya	365/104

OTHER PUBLICATIONS

Altman, "Here Comes the Big New 64-K ROMS", *Electronics*, 3/30/78, pp. 94-99.

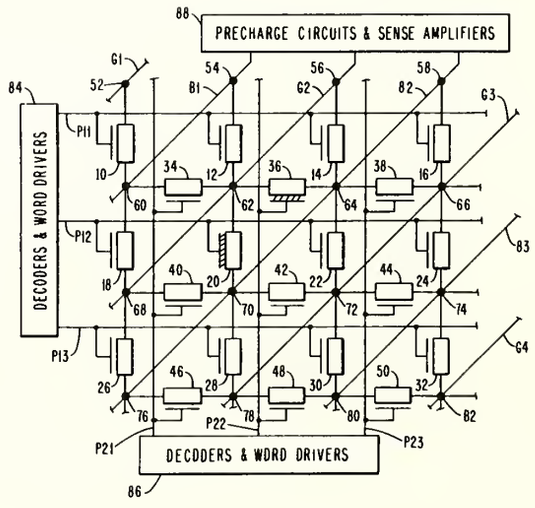
Primary Examiner—Stuart N. Hecker

Attorney, Agent, or Firm—Stephen J. Limanek

[57] **ABSTRACT**

An array of transistors suitable for use in a read only memory includes a plurality of spaced apart first conductive lines insulated from a semiconductor substrate and a plurality of spaced apart second conductive lines insulated from the substrate and from the first lines and disposed to intersect the first lines. Diffusion regions formed in the substrate as current carrying electrodes are defined by the first and second lines. A plurality of spaced apart third conductive lines are arranged to intersect the first and second lines and to connect to the diffusion regions. When the array is used in a read only memory, selected transistors of the array are made to have a different threshold voltage than that of the remaining transistors and the first and second lines form word lines, the third lines form bit or sense and ground lines and the diffusion regions form the source and drain regions of the transistors, with each diffusion region serving up to four transistors or cells.

24 Claims, 6 Drawing Figures



THIS DATA STORAGE METHOD USES AN ACCELERATED BEAM OF IONS TO DAMAGE DATA STORAGE AREAS WITHIN AN ARCHIVAL ROM STORAGE MATRIX. DAMAGED STORAGE AREAS REPRESENT ONE BINARY STATE WHILE UNDAMAGED AREAS REPRESENT THE OTHER STATE. THE INVENTION AVOIDS THE PRECISE CONTROL REQUIREMENTS OF THE TRADITIONAL DOPANT IMPLANT METHOD OF STORING DATA IN SUCH A MEMORY. READ-OUT IS ACCOMPLISHED BY SCANNING THE REGIONS WITH A HIGHLY-FOCUSED ELECTRON BEAM, CAUSING THE UNDAMAGED REGIONS TO EXHIBIT AN INCREASED CURRENT.

United States Patent [19]

Kirkpatrick et al.

[11] **4,099,261**

[45] **Jul. 4, 1978**

[54] **METHOD FOR WRITING ON ARCHIVAL MEMORY TARGET BY ION DAMAGE**

[75] Inventors: **Conilee G. Kirkpatrick; George E. Possin,** both of Schenectady, N.Y.

[73] Assignee: **General Electric Company,** Schenectady, N.Y.

[21] Appl. No.: **770,698**

[22] Filed: **Feb. 22, 1977**

[51] **Int. Cl.**[2] **G11C 13/00**

[52] **U.S. Cl.** **365/105;** 315/84.5; 328/123; 365/128

[58] **Field of Search** .... 340/173 R, 173 CR, 173 LM; 315/84.5; 328/123; 365/103, 105 D, 128 X

[56] **References Cited**

U.S. PATENT DOCUMENTS

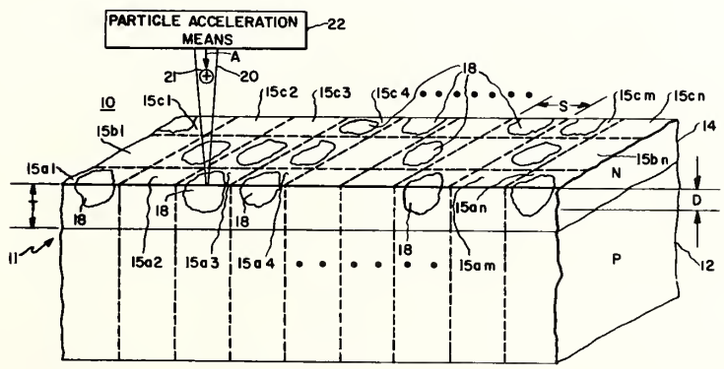
3,362,017	1/1968	Brahm	340/173 CR
3,763,476	10/1973	Wilson	340/173 CR
3,879,714	4/1975	Veith	340/173 CR

Primary Examiner—Terrell W. Fears
Attorney, Agent, or Firm—Geoffrey H. Krauss; Joseph T. Cohen; Marvin Snyder

[57] **ABSTRACT**

A method for storing data in an archival memory semiconductor target by inducing damage to the semiconductor lattice at selected ones of a plurality of storage sites arranged as a two-dimensional array upon a surface of the target. Ions are accelerated and collimated as a beam to impinge upon a target surface to induce the damage to a controlled depth, whereby subsequent illumination of a damaged data site by an electron beam will allow the beam-produced electron-hole pairs to recombine within the damaged area to prevent increased current flow and read a binary zero bit, while hole migrations through a target depletion region will cause increased current flow, at an undamaged data site, to indicate a binary one data bit.

12 Claims, 2 Drawing Figures



IN THIS METHOD OF STORING DATA IN A ROM, A LAYER OF A FIRST POLARITY TYPE MATERIAL WHICH HAS BEEN FABRICATED UPON A SUBSTRATE OF AN OPPOSITE POLARITY TYPE MATERIAL IS THEN OVERLAYED WITH A NON-DOPING MATERIAL LAYER. DATA OF A FIRST BINARY STATE IS STORED BY HEATING SELECTED DATA STORAGE SITES, CAUSING AN ALLOY OF SEMICONDUCTOR MATERIAL AND NON-DOPING MATERIAL TO BE FORMED AT THESE REGIONS. NON-ALLOYED REGIONS REPRESENT THE OTHER BINARY STATE. READ-OUT IS ACCOMPLISHED AS IN 4,099,261.

United States Patent [19]

Norton et al.

[11] **4,128,897**

[45] **Dec. 5, 1978**

[54] **ARCHIVAL MEMORY MEDIA AND METHOD FOR INFORMATION RECORDING THEREON**

[75] Inventors: **James F. Norton**, Alplaus; **Harold G. Parks**, Scotia; **George E. Possin**, Schenectady, all of N.Y.

[73] Assignee: **General Electric Company**, Schenectady, N.Y.

[21] Appl. No.: **780,175**

[22] Filed: **Mar. 22, 1977**

[51] **Int. Cl.**[2] **G11C 11/42**; G11C 17/06

[52] **U.S. Cl.** ..... **365/118**; 29/576 B; 29/590; 148/185; 219/121 EM; 219/121 LM; 357/29; 365/103; 365/114

[58] **Field of Search** ..... 340/173 CR, 173 LS; 346/76 R, 76 L; 357/61, 63, 45, 90; 219/121 L, 121 LM, 121 EB, 121 EM; 365/118, 217, 115, 114, 112, 106, 128, 105

[56] **References Cited**

U.S. PATENT DOCUMENTS

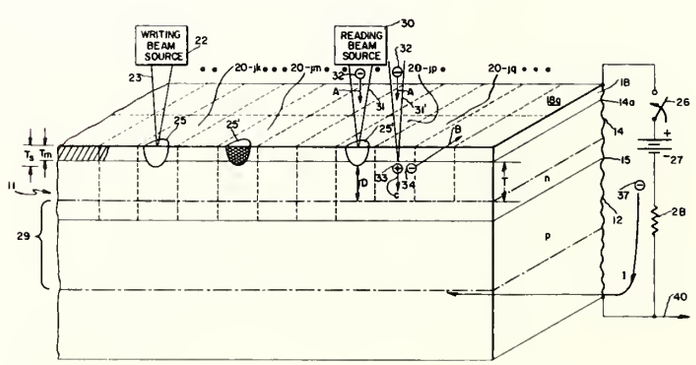
3,599,181	9/1971	Dearnaley	340/173 CR
3,761,895	10/1973	Ellis et al.	340/173 LS
3,975,756	9/1976	Lanigan et al.	357/63
4,064,495	12/1977	Kirkpatrick et al.	365/118 X
4,081,794	3/1978	Parks et al.	365/118

Primary Examiner—Bernard Konick
Assistant Examiner—Donald McElheny
Attorney, Agent, or Firm—Geoffrey H. Krauss; Joseph T. Cohen; Marvin Snyder

[57] **ABSTRACT**

Binary information is stored in a semiconductor archival memory medium by formation of a region of an alloy, of the semiconductor material and a non-doping material, at each of a plurality of potential memory sites at which a first binary value of information is to be stored, with the remaining data sites being devoid of the alloyed region to store the remaining value of binary data. Methods for writing the formation of the alloyed region, and reading the information value stored at each memory site, are also disclosed.

14 Claims, 1 Drawing Figure



THIS INVENTION IS DIRECTED TO AN IMPROVED METAL-NITRIDE-OXIDE SEMICONDUCTOR OR MNOS MEMORY CELL WHICH IS SUITABLE FOR VERY LARGE SCALE INTEGRATION OR VLSI TECHNIQUES. TYPICALLY, THE THIN GATE OXIDES AND FLAT DIFFUSION LAYERS REQUIRED BY VLSI CIRCUITS RESULT IN PREMATURE PN-AVALANCHE BREAKDOWN (THE LIBERATION OF HOLE-ELECTRON PAIRS FROM THE THE CRYSTAL DUE TO THE ACCELERATION OF MINORITY CARRIERS BY AN APPLIED ELECTRIC FIELD ACROSS THE PN JUNCTION) OF THE TRANSISTORS DURING "SHORT CHANNEL ERASURE" OF MEMORY CELLS. SHORT CHANNEL ERASURE IS ACCOMPLISHED BY APPLYING A POSITIVE PULSE TO THE SOURCE AND DRAIN ZONE WHILE APPLYING GROUND TO THE SUBSTRATE AND GATE, THUS ERASING THE PREVIOUSLY PROGRAMMED CELLS. THE INVENTIVE CELL IS CONSTRUCTED USING A MULTI-LAYER GATE INSULATING LAYER WHICH SHIFTS THE PN-AVALANCHE BREAKDOWN PROBABILITY TOWARD THE DESIRED RANGE.

United States Patent [19]

Jacobs et al.

[11] **4,330,850**

[45] **May 18, 1982**

[54] **MNOS MEMORY CELL**

[75] Inventors: **Erwin Jacobs**, Vaterstetten; **Ulrich Schwabe**; **Dezsoe Takacs**, both of Munich, all of Fed. Rep. of Germany

[73] Assignee: **Siemens Aktiengesellschaft**, Berlin & Munich, Fed. Rep. of Germany

[21] Appl. No.: **146,392**

[22] Filed: **Apr. 30, 1980**

[30] **Foreign Application Priority Data**

May 10, 1979 [DE] Fed. Rep. of Germany 2918888

[51] **Int. Cl.**[3] **G11C 11/40**

[52] **U.S. Cl.** **365/185**; 365/184; 357/23

[58] **Field of Search** ..... 365/184, 185, 182; 357/23, 67, 23 VT; /

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,836,992	9/1974	Abbas et al.	365/185
4,128,670	12/1978	Gaensslen	357/67
4,225,945	9/1980	Kuo	365/182
4,227,202	10/1980	Tasch et al.	357/24

OTHER PUBLICATIONS

Das Gupta et al. "Dual—Gate FAMOS Memory Cell", IBM Tech. Disc. Bul., vol. 17, No. 8, 1/75, pp. 2266.

Hagiwara et al., "A 16 Bit Electrically Erasable PROM Using N-Channel Si-Gate MNOS Technology," IEEE Jour. of S-S Circuits, vol. SC-15, No. 3, 6/80, pp. 346–353.

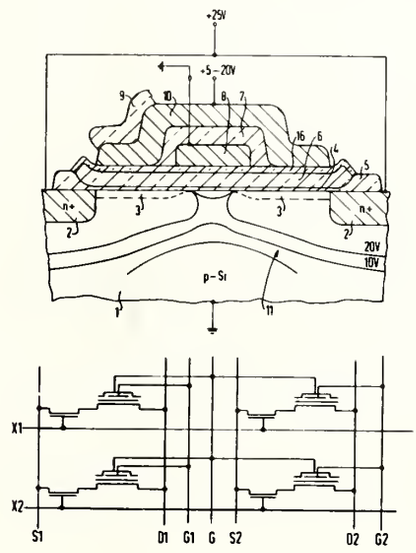
Primary Examiner—Stuart N. Hecker

Attorney, Agent, or Firm—Hill, Van Santen, Steadman, Chiara & Simpson

[57] **ABSTRACT**

The invention relates to a MNOS memory cell arrangement in VLSI (very large scale integration) technology comprised of a multi-layer gate insulating layer covering a surface of a semiconductor body in the region between the source and drain zones. In order to avoid breakdowns at the source and drain zone edges before an erasure voltage is attained, the gate electrode is split into two electrodes, which can be operated in different ways and which are superimposed on upon another. These gate electrodes are connected via self-aligned, overlapped contacts. This arrangement resolves "short channel erasure", even in the case of VLSI technology. The invention can be applied as required to MNOS EEPROM memory devices.

8 Claims, 10 Drawing Figures



THIS MEMORY CELL IS DESIGNED TO BE RESISTANT TO THE EFFECTS OF NUCLEAR RADIATION. TECHNIQUES EMPLOYED INCLUDE: INCREASING THE TIME CONSTANT FOR CHARGING THE MEMORY CELL TO DELAY RESPONSE TO THE TRANSIENT EFFECTS OF NUCLEAR RADIATION; USING SILICON-ON-SAPPHIRE FABRICATION TO DIMINISH THE EFFECT OF PHOTOCURRENTS; AND USING AN EXTERNAL RADIATION DETECTOR TO APPLY AN INHIBIT SIGNAL TO THE INTERFACE CONTROL LOGIC OF THE REGISTER FILE.

United States Patent [19]

Gunckel, II et al.

[11] **4,130,892**

[45] **Dec. 19, 1978**

[54] **RADIATION HARD MEMORY CELL AND ARRAY THEREOF**

[75] Inventors: **Thomas L. Gunckel, II**, Santa Ana; **Alex Rovell**, Yorba Linda, both of Calif.; **Robert L. Nielsen**, Fairport, N.Y.

[73] Assignee: **Rockwell International Corporation**, El Segundo, Calif.

[21] Appl. No.: **756,454**

[22] Filed: **Jan. 3, 1977**

[51] Int. Cl.[2] **G11C 11/40**; G11C 7/02

[52] U.S. Cl. **365/154**; 307/279; 365/156; 365/190

[58] **Field of Search** ..... 340/173 R, 173 FF; 307/279, 291, DIG. 3; 365/154, 156, 190

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,706,811	4/1955	Steele	340/173 FF
3,636,527	1/1972	Zuk	340/173 FF
3,731,119	5/1973	Matzen	307/291
3,980,899	9/1976	Shimada et al.	340/173 FF
4,038,567	7/1977	Lewis et al.	307/DIG. 3

FOREIGN PATENT DOCUMENTS

456354 2/1975 U.S.S.R. ..... 340/173 FF

OTHER PUBLICATIONS

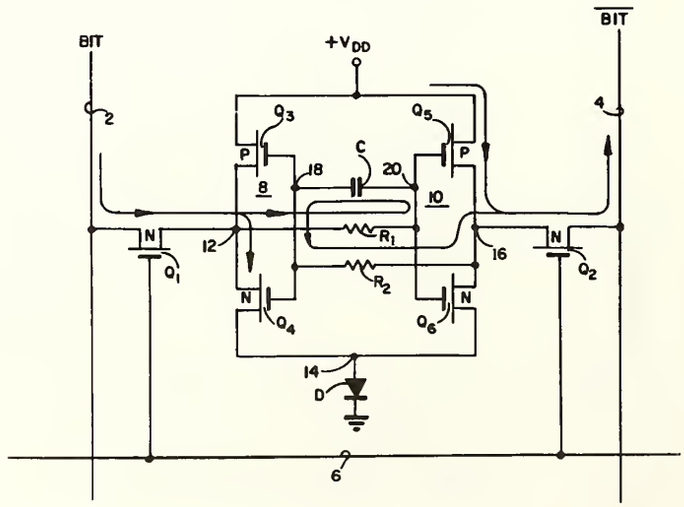
Arzubi, Write/Sense Scheme for Monolithic Memories, IBM Technical Disclosure Bulletin, vol. 18, No. 8, 1/76, pp. 2450-2451.

Primary Examiner—Stuart N. Hecker
Attorney, Agent, or Firm—H. Fredrick Hamann; G. Donald Weber, Jr.; Morland C. Fischer

[57] **ABSTRACT**

A memory cell configuration that is implemented to be relatively hard to the adverse effects of a nuclear event. The presently disclosed memory cell can be interconnected with other like memory cells to form a high speed radiation hard register file. Information is selectively written into and read out of a memory cell comprising the register file, which memory cell preserves previously stored data without alteration in the event of exposure to high levels of nuclear radiation.

19 Claims, 3 Drawing Figures



THIS INVENTION INVOLVES THE FORMATION OF V SHAPED, METAL OXIDE SEMICONDUCTOR (V-MOS) SINGLE TRANSISTOR STORAGE CELLS. IN THE INVENTIVE CELL, THE NORMALLY REQUIRED EPITAXIAL LAYER IS REPLACED WITH AT LEAST TWO ADDITIONAL LAYERS WHICH CAN BE PRODUCED BY DIFFUSION OR IMPLANTATION. THE ELIMINATION OF THE EPITAXIAL LAYER ENABLES SIMPLE PRODUCTION OF THE STRUCTURES SINCE THE TIME REQUIRED FOR THE CRYSTALLINE GROWTH IS ELIMINATED. THE CELL CAN, ACCORDINGLY, BE MORE EFFICIENTLY MASS-PRODUCED.

United States Patent [19]

Hoffmann et al.

[11] **4,156,289**

[45] **May 22, 1979**

[54] **SEMICONDUCTOR MEMORY**

[75] Inventors: **Kurt Hoffmann**, Taufkirchen; **Rudolf Mitterer**, Gauting, both of Fed. Rep. of Germany

[73] Assignee: **Siemens Aktiengesellschaft**, Berlin & Munich, Fed. Rep. of Germany

[21] Appl. No.: **872,443**

[22] Filed: **Jan. 26, 1978**

[30] **Foreign Application Priority Data**

Jan. 31, 1977 [DE] Fed. Rep. of Germany 2703871

[51] **Int. Cl.**[2] **G11C 11/40**

[52] **U.S. Cl.** **365/182;** 357/55; 365/178; 365/186

[58] **Field of Search** 357/20, 55, 60; 365/174, 178, 182, 186

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,003,036 1/1977 Jenne 357/20

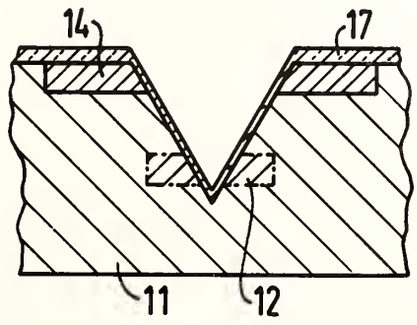
Primary Examiner—Stuart N. Hecker

Attorney, Agent, or Firm—Hill, Gross, Simpson, Van Santen, Steadman, Chiara & Simpson

[57] **ABSTRACT**

A semiconductor memory has at least one V-MOS transistor which includes a trench and a storage capacitor. A semiconductor substrate is doped with concentration centers of a first conductivity type and has a buried layer which is doped with concentration centers of a second conductivity type opposite to the first conductivity type. At least two additional layers are divided by the trench and have alternately differing conductivity types, the two additional layers and the buried layer being produced by diffusion and/or implantation.

5 Claims, 6 Drawing Figures



THE USE OF TRADITIONAL STATIC SEMICONDUCTOR MEMORY CELLS IN MICROPROCESSOR RAM'S IS EXPENSIVE SINCE SUCH CELLS NORMALLY EMPLOY SIX TRANSISTORS AND, ACCORDINGLY, ARE LIMITED TO MUCH LOWER DENSITIES THAN ONE-TRANSISTOR DYNAMIC CELLS. IN THE INVENTIVE MEMORY CELL, THE NORMAL LOAD RESISTORS OF A CROSS-COUPLED BISTABLE CIRCUIT ARE REPLACED WITH A PAIR OF SERIES COUPLING TRANSISTORS WHICH ARE OPERATIVE TO CONNECT STORAGE NODES OF THE BISTABLE CIRCUIT TO COMPLEMENTARY PRECHARGED DATA LINES DURING "REFRESH" CYCLES. THE REPLACEMENT OF THE LOAD RESISTORS ACHIEVES A GREATER PACKING DENSITY FOR THE CELLS.

United States Patent [19]

Ponder

[11] **4,334,293**

[45] **Jun. 8, 1982**

[54] **SEMICONDUCTOR MEMORY CELL WITH CLOCKED VOLTAGE SUPPLY FROM DATA LINES**

[75] Inventor: **James E. Ponder**, Cat Spring, Tex.

[73] Assignee: **Texas Instruments Incorporated**, Dallas, Tex.

[21] Appl. No.: **148,614**

[22] Filed: **May 12, 1980**

Related U.S. Application Data

[63] Continuation of Ser. No. 925,893, Jul. 19, 1978, Pat. No. 4,209,851.

[51] Int. Cl.[3] **G11C 7/00**; G11C 11/40

[52] U.S. Cl. **365/190**; 365/154; 365/222

[58] Field of Search 365/154, 190, 205, 222; 307/279, 291

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,550,097 12/1970 Reed 365/190

4,103,185 7/1978 Denes 307/279

FOREIGN PATENT DOCUMENTS

1011457 5/1977 Canada 307/279

OTHER PUBLICATIONS

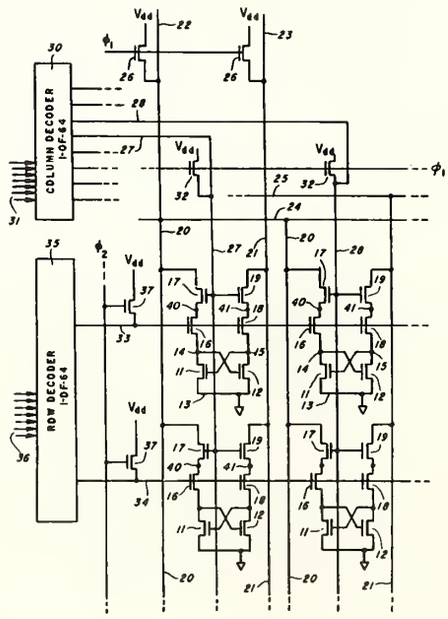
Miller, COS/MOS Random Access Memories, IEEE Digest, pp. 34–35, 3/71.

Primary Examiner—Stuart N. Hecker
Attorney, Agent, or Firm—John G. Graham

[57] **ABSTRACT**

An MOS memory cell of the static type employs a pair of cross-coupled driver transistors forming a bistable circuit, with load resistors replaced by a pair of series coupling transistors connecting storage nodes to complementary precharged data lines. The coupling transistors are turned on in sequence, for refresh, so an intermediate node is charged during a first phase and discharged into the storage nodes during the second phase. Both transistors are turned on at the same time for read or write operations.

8 Claims, 2 Drawing Figures



ALL MEMORY CELLS IN A ROW OF THIS MEMORY MATRIX CAN BE RESET MERELY BY INTERRUPTING THE CELL SUSTAINING CURRENT ON THEIR COMMON CURRENT SOURCELINE. WHEN THE CELL SUSTAINING CURRENT IS RESUMED, THE ASYMMETRICAL NATURE OF THE MEMORY CELLS BIASES THE CELLS INTO A RESET CONDITION BY DIRECTING MORE CURRENT THROUGH ONE SIDE OF THE CELL THAN THE OTHER. SEVERAL EMBODIMENTS ARE DISCLOSED.

United States Patent [19]

Brown

[11] **4,035,784**

[45] **July 12, 1977**

[54] **ASYMMETRICAL MEMORY CELL ARRANGEMENT**

[75] Inventor: **George W. Brown**, San Jose, Calif.

[73] Assignee: **Fairchild Camera and Instrument Corporation**, Mountain View, Calif.

[21] Appl. No.: **642,956**

[22] Filed: **Dec. 22, 1975**

[51] **Int. Cl.²** **G11C 11/40**

[52] **U.S. Cl.** ..... **340/173 R**; 340/173 FF; 307/238

[58] **Field of Search** ..... 340/173 R, 173 FF; 307/238, 279

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,801,967 4/1974 Berger ..... 340/173 LI

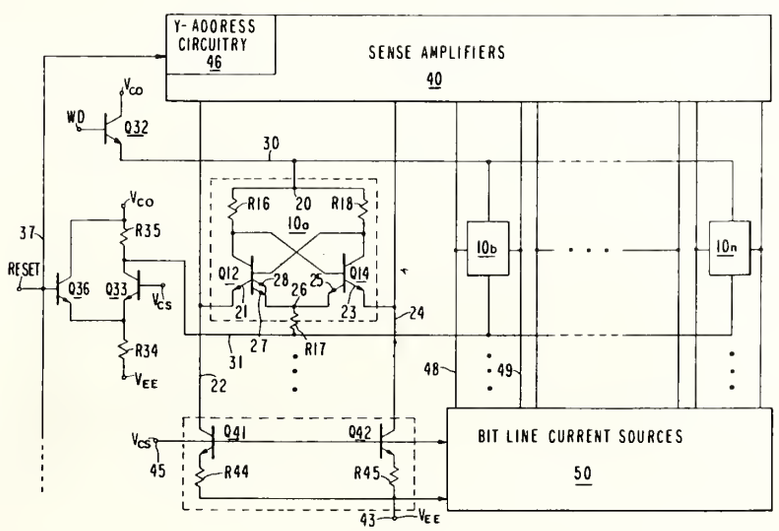
Primary Examiner—Terrell W. Fears

Attorney, Agent, or Firm—Alan H. MacPherson; Henry K. Woodward; Norman E. Reitz

[57] **ABSTRACT**

A memory cell is provided which comprises a word line, a current source line, a pair of bit lines, a first transistor having a base terminal, a collector terminal coupled to the word line, a first emitter coupled to a first of the pair of bit lines, a second emitter coupled to the current source line, a second transistor having a base terminal coupled to the collector terminal of the first transistor, a collector terminal coupled to the word line and to the base of the first transistor, a first emitter coupled to a second of the pair of bit lines, and a second emitter coupled to the current source line, and means for directing more current through the second transistor than through the first transistor.

7 Claims, 5 Drawing Figures



THIS SERIAL-PARALLEL-SERIAL CCD MEMORY USES A FAN-OUT CIRCUIT AT THE INPUT TO A PLURALITY OF PARALLEL CCD SHIFT REGISTERS. OUTPUT FROM THE REGISTERS IS VIA A FAN-IN CIRCUIT. BY SANDWICHING A PLURALITY OF CCD REGISTERS IN PARALLEL BETWEEN AN INPUT AND AN OUTPUT STORAGE NODE, A GREATLY INCREASED STORAGE DENSITY IS ACHIEVED.

United States Patent [19]

Harroun et al.

[11] **4,288,864**

[45] **Sep. 8, 1981**

[54] **SERIAL-PARALLEL-SERIAL CCD MEMORY SYSTEM WITH FAN OUT AND FAN IN CIRCUITS**

[75] Inventors: **Thomas V. Harroun**, Essex Junction; **Lawrence G. Heller**, South Burlington; **Norbert G. Vogl, Jr.**, Colchester, all of Vt.

[73] Assignee: **International Business Machines Corporation**, Armonk, N.Y.

[21] Appl. No.: **87,843**

[22] Filed: **Oct. 24, 1979**

[51] **Int. Cl.**[3] **G11C 11/40**; G11C 19/28

[52] **U.S. Cl.** **365/219**; 357/24; 365/183; 365/238

[58] **Field of Search** 365/183, 219, 238; 357/24

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,889,245	6/1975	Gosney	365/183
3,902,186	8/1975	Engeler et al.	357/24
3,913,077	10/1975	Erb	365/238
3,967,254	6/1976	Kosonocky et al.	365/183
4,024,514	5/1977	Elmer et al.	357/24
4,028,671	6/1977	Leach	365/183
4,117,546	9/1978	Anantha et al.	365/183
4,199,691	4/1980	Angle	365/183
4,211,936	7/1980	Kosonocky et al.	365/221 D

OTHER PUBLICATIONS

Altman, "Charge-Coupled Devices Move on Memories and Analog Signal Processing", *Electronics*, 8/8/74, pp. 91–101.

Kohyama et al, "A New Multiplexed Electrode-Per-Bit Structure for a 64-K Bit Charge-Coupled-Device Memory", IEEE Jour. No. 4, Solid-State Cir. 8/77, vol. SC-12, pp. 335–343.

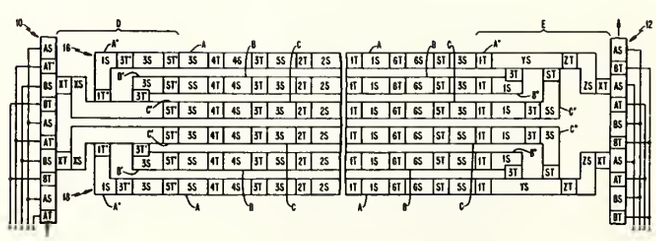
Primary Examiner—Stuart N. Hecker

Attorney, Agent, or Firm—Stephen J. Limanek

[57] **ABSTRACT**

An SPS CCD memory system is provided wherein a single tap, preferably a storage node, on an input serial or shift register is connected to the input of a plurality of parallel shift registers through a fan out circuit and the output of the plurality of parallel shift registers is connected to a single tap, preferably a storage node, on an output serial or shift register through a fan in circuit.

9 Claims, 9 Drawing Figures



SEMICONDUCTOR MEMORIES

Reference Citation Information

During the examination of an application for a patent in the United States Patent and Trademark Office, references may be cited by the examiner and/or the applicant to indicate the prior art which is most closely related to the claimed invention. Other references may be cited merely to demonstrate the current state of the art. The information below is based on the references made of record during the examination of U.S. applications which were issued as patents in the subject technology during the period 1/1975-6/1982. A more detailed explanation appears in Appendix A.

TOTAL PATENTS ISSUED (1/1975-6/1982)	694
TOTAL REFERENCES CITED	3066
U.S. Patent References Cited	2560
Foreign Patent References Cited	44
Other References Cited	462

COUNTRY OF ORIGIN OF U.S. PATENT REFERENCES CITED*	NUMBER OF CITATIONS
United States	1963
Japan	237
West Germany	151
Netherlands	45
United Kingdom	45
France	37
Canada	14
Switzerland	5

MOST FREQUENTLY CITED PATENTS	NUMBER OF CITATIONS
3,763,480	23
3,728,695	17
3,889,245	14
3,914,855	13

MOST FREQUENTLY CITED ASSIGNEES**	NUMBER OF CITATIONS
International Business Machines Corp.	400
Texas Instruments, Inc.	191
RCA Corp.	187
Intel Corp.	138

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*"Country of Origin" information is limited to U.S. patent references issued from 1/1963-6/1982.

**Assignee information is limited to U.S. patent references issued from 1/1969-6/1982.

SPEECH ANALYSIS AND SYNTHESIS

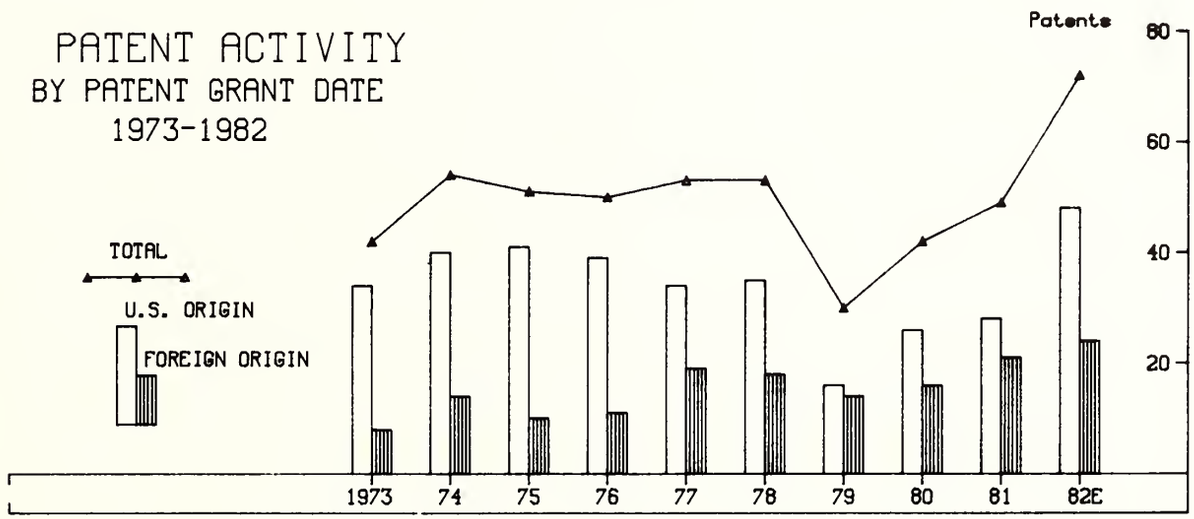
This profile includes systems which analyze voice signals by breaking them into their component parts, systems which compress the data representing these parts by eliminating redundant information, and systems which reconstruct the original speech signal from the compressed data. Also included are self-contained systems which artificially generate speech from stored data.

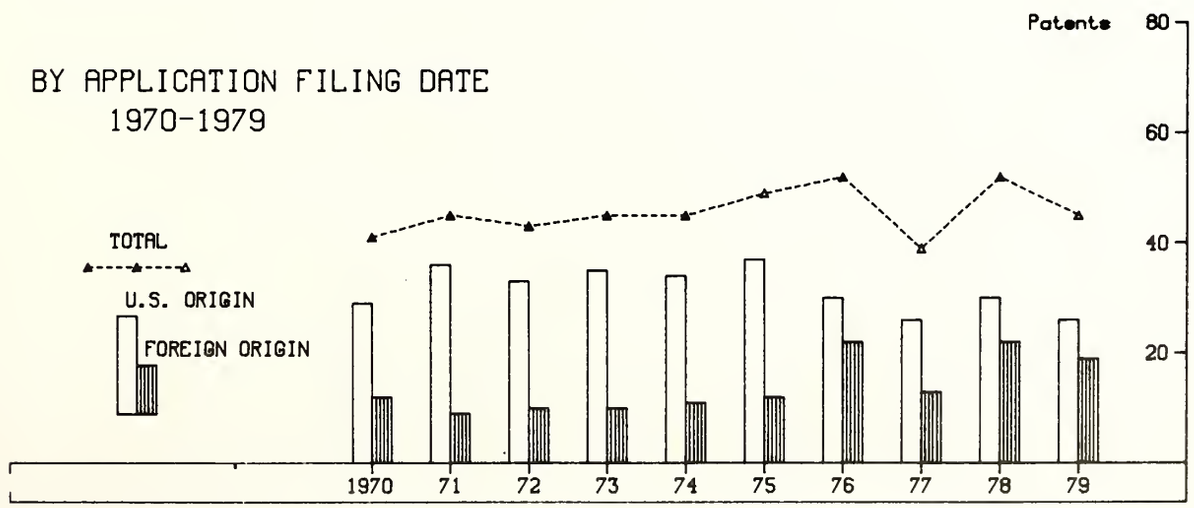
INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM:

Class 179, Subclasses 1SA-1SP,
15.55R and 15.55T

ACTIVITY INDICES (1/1980-6/1982)

GROWTH	27.6%
FOREIGN SHARE	38.6%
CORPORATE OWNED	81.9%
GOVERNMENT OWNED	4.7%
U.S. OWNED OF FOREIGN	6.1%





SPEECH ANALYSIS + SYNTHESIS — **PART 2A**

PATENT ACTIVITY (1/63- 6/82) BY DATE OF PATENT GRANT

	NUMBER OF PATENTS															
	63-68	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	TOTAL
TOTAL	245	59	62	62	52	42	54	51	50	53	53	30	42	49	36	940
U.S. ORIGIN	212	51	54	45	36	34	40	41	39	34	35	16	26	28	24	715
FOREIGN ORIGIN	33	8	8	17	16	8	14	10	11	19	18	14	16	21	12	225
JAPAN	4	2	1	8	8	5	5	4	4	10	7	10	12	13	7	100
UNITED KINGDOM	9	1	3	3	1	1	3		2		3	2	2	1		31
FRANCE	2	2	1	2	2	1	4	3	1	4	2	1	1		2	28
WEST GERMANY	4	1	2		2			2	1		1	1		1	1	16
NETHERLANDS	5			1	1	1	2			3	1					14
SWITZERLAND	1			2				1	2		1			3		10
SWEDEN	6				1									1		8
ITALY	2								1	2			1		1	7
CANADA					1						1				1	3
AUSTRIA		2									1					3
BELGIUM			1	1												2
ISRAEL														1		1
U.S.S.R.											1					1
BULGARIA														1		1
U.S. ORIGIN	212	51	54	45	36	34	40	41	39	34	35	16	26	28	24	715
U.S. CORP. OWNED	169	45	49	33	29	24	23	24	26	26	28	12	20	23	16	547
U.S. GOVT. OWNED	17		2	6	2	3	3	7	5	4	2	1	2	1	2	57
U.S. INDIV. OWNED	25	6	2	6	5	7	14	9	8	4	5	3	4	4	6	108
FOREIGN OWNED	1		1					1								3
FOREIGN ORIGIN	33	8	8	17	16	8	14	10	11	19	18	14	16	21	12	225
U.S. OWNED	10	4	1	4	2	1	4	3	1	3	4		1	2		40
FOREIGN OWNED	23	4	7	13	14	7	10	7	10	16	14	14	15	19	12	185
FOREIGN CORP.	17	3	7	11	12	6	7	7	9	15	11	13	14	18	10	160
FOREIGN GOVT.		1		1									1			3
FOREIGN INDIV.	6			1	2	1	3		1	1	3	1		1	2	22

SPEECH ANALYSIS + SYNTHESIS

PATENT ACTIVITY (PATENTS GRANTED 1/67- 6/82) BY DATE OF PATENT APPLICATION

	NUMBER OF PATENTED APPLICATIONS															
	PRE 69	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	TOTAL
TOTAL	261	48	41	45	43	45	45	49	54	39	53	52	29	1		805
U.S. ORIGIN	216	34	29	36	33	35	34	37	32	26	30	30	20	1		593
FOREIGN ORIGIN	45	14	12	9	10	10	11	12	22	13	23	22	9			212
JAPAN	8	7	7	7	3	4	2	6	11	8	15	14	6			98
UNITED KINGDOM	12		2		3	1	1		2	2	4					27
FRANCE	6	3		1	3	3	2	2	4		2	1	1			28
WEST GERMANY	5	2				1	2		1		1	2				14
NETHERLANDS	3		1	1	1	1	1	1	1	1						11
SWITZERLAND	1	1					3		1	1		2				9
SWEDEN	6		1									1				8
ITALY	1							2	1		1		1			6
CANADA			1							1			1			3
AUSTRIA	2							1								3
BELGIUM	1	1														2
ISRAEL												1				1
U.S.S.R.									1							1
BULGARIA												1				1
U.S. ORIGIN	216	34	29	36	33	35	34	37	32	26	30	30	20	1		593
U.S. CORP. OWNED	184	26	22	23	19	21	22	25	25	22	24	22	15	1		451
U.S. GOVT. OWNED	16	4	2	4	2	5	5	5	3		1	2	2			51
U.S. INDIV. OWNED	15	4	5	9	12	9	6	7	4	4	5	6	3			89
FOREIGN OWNED	1						1									2
FOREIGN ORIGIN	45	14	12	9	10	10	11	12	22	13	23	22	9			212
U.S. OWNED	13	1	2	1	3	2	4	2	3	1	1	2				35
FOREIGN OWNED	32	13	10	8	7	8	7	10	19	12	22	20	9			177
FOREIGN CORP.	27	12	7	8	5	7	6	10	16	11	20	18	8			155
FOREIGN GOVT.	2										1					3
FOREIGN INDIV.	3	1	3		2	1	1		3	1	1	2	1			19

SPEECH ANALYSIS AND SYNTHESIS

Organizational Patenting: Ranked

NO. OF PATENTS	ASSIGNEES WITH 3 OR MORE PATENTS (1/1969-6/1982)
85	BELL TELEPHONE LABORATORIES INC.
29	INTERNATIONAL BUSINESS MACHINES CORP.
23	NIPPON ELECTRIC CO., LTD.
19	UNITED STATES OF AMERICA, NAVY
16	TEXAS INSTRUMENTS, INC.
13	UNITED STATES OF AMERICA, ARMY
13	U.S. PHILIPS CORP.
10	HITACHI, LTD.
10	INTERNATIONAL TELEPHONE AND TELEGRAPH CORP.
9	SHARP KABUSHIKI KAISHA
9	THRESHOLD TECHNOLOGY INC.
8	AERONUTRONIC FORD CORP.
8	COMMUNICATIONS SATELLITE CORP.
8	THOMSON-CSF
8	WESTINGHOUSE ELECTRIC CORP.
7	CAMBRIDGE RESEARCH AND DEVELOPMENT GROUP
7	INTERNATIONAL STANDARD ELECTRIC CORP.
7	XEROX CORP.
6	NIPPON TELEGRAPH AND TELEPHONE PUBLIC CORP.
6	SONY CORP.
5	FEDERAL SCREW WORKS
5	FUJI XEROX CO., LTD.
5	MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.
5	RCA CORP.
4	DIALOG SYSTEMS, INC.
4	E-SYSTEMS, INC.
4	GENERAL ELECTRIC CO.
4	GTE SYLVANIA INC.
4	HUGHES AIRCRAFT CO.
4	KOKUSAI DENSHIN DENWA KABUSHIKI KAISHA
4	MOTOROLA INC.
4	SANTA RITA TECHNOLOGY, INC.
4	UNITED STATES OF AMERICA, NASA
3	GENERAL DYNAMICS CORPORATION
3	INTERNATIONAL COMPUTERS LTD.
3	LOCKHEED MISSILES & SPACE CO., INC.
3	OCTRONIX, INC.
3	SCITRONIX CORP.
3	SINGER CO.
3*	SOUTHERN PACIFIC CO.
3*	STANDARD TELEPHONES AND CABLES PTY, LTD.
3	UNITED STATES OF AMERICA, AIR FORCE
3	VICTOR COMPANY OF JAPAN, LTD.

*Composite Total. See Appendix A.

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

AERONUTRONIC FORD CORPORATION (FORMERLY PHILCO-FORD CORP.)
- 3437761 - SPEECH APPARATUS WHICH PRODUCES A TIME- MULTIPLEX SIGNAL HAVING AN INTERLACE PATTERN
- 3491205 - PLURAL FORMAT SPEECH SYNTHESIZER
- 3499986 - SPEECH SYNETHESIZER
- 3499991 - VOICE-EXCITED VOCODER
- 3548100 - FORMANT FREQUENCY EXTRACTOR
- 3573374 - FORMANT VOCODER UTILIZING RESONATOR DAMPING
- 3603738 - TIME-DOMAIN PITCH DETECTOR AND CIRCUITS FOR EXTRACTING A SIGNAL REPRESENTATIVE OF PITCH PULSE SPACING REGULARITY IN A SPEECH WAVE
- 3706929 - COMBINED MODEM AND VOCODER PIPELINE PROCESSOR

AGENCE NATIONALE DE VALORISATION DE LA RECHERCHE (ANVAR)
- 3632887 - PRINTED DATA TO SPEECH SYNTHESIZER USING PHONEME-PAIR COMPARISON

AMERICAN ELECTRONIC LABORATORIES, INC.
- 3659052 - MULTIPLEX TERMINAL WITH REDUNDANCY REDUCTION

AMERICAN OPTICAL CORPORATION
- 4109243 - DATA SEQUENCE DISPLAY SYSTEM AND TIME-COMPRESSION SYSTEM THEREFOR
- 4110564 - TIME-COMPRESSION SYSTEM

AM INTERNATIONAL, INC.
- 3739085 - CODING TECHNIQUE

ANDERSEN, BYRAM, KOUMA, MURPHY, LOCKARD CARNEY
- 3928724 - VOICE-ACTUATED TELEPHONE DIRECTORY-ASSISTANCE SYSTEM

ARTHUR D. LITTLE INC.
- 3495042 - SPEECH COMPRESSION DEVICE

ARVIN INDUSTRIES, INC.
- 3809805 - VIDEO BANDWIDTH REDUCTION
- 3825677 - TELEVISION SCAN CONVERTER BANDWIDTH REDUCTION DEVICE

ASAHI KOGAKU KOGYO KABUSHIKI KAISHA
- 4222394 - SYSTEM FOR PROCESSING A WAVEFORM FOR A LARYNX STROBOSCOPE
- 4273959 - LARYNX STROBOSCOPE DEVICE

ATARI, INC.
- 4104625 - APPARATUS FOR PROVIDING FACIAL IMAGE ANIMATION

AUTOPHON AKTIENGESELLSCHAFT
- 3622885 - SYSTEM FOR THE PARALLEL TRANSMISSION OF SIGNALS

BACH LABORATORIES, INC.
- 4230012 - MUSICAL INSTRUMENT AND METHOD FOR USE THEREIN

BEHAVIORAL CONTROLS, INC.
- 4143648 - PORTABLE THERAPEUTIC APPARATUS HAVING PATIENT RESPONSIVE FEEDBACK MEANS

BELL + HOWELL COMPANY
- 4181822 - BANDSPLITTER SYSTEMS

BELL TELEPHONE LABORATORIES INCORPORATED
- 3420955 - AUTOMATIC PEAK SELECTOR
- 3422227 - DUAL CODE DIFFERENTIAL ENCODING SCHEME FOR VIDEO SIGNALS

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

BELL TELEPHONE LABORATORIES INCORPORATED (CONTINUED)

3424869 - DIGITAL SPEECH INTERPOLATION COMMUNICATION SYSTEM
3428748 - VOWEL DETECTOR
3431362 - VOICE-EXCITED, BANDWIDTH REDUCTION SYSTEM EMPLOYING PITCH FREQUENCY PULSES GENERATED BY UNENCODED BASEBAND SIGNAL
3437757 - SPEECH ANALYSIS SYSTEM
3439122 - SPEECH ANALYSIS SYSTEM
3440350 - RECEPTION OF SIGNALS TRANSMITTED IN A REVERBERANT ENVIRONMENT
3448216 - VOCODER SYSTEM
3462555 - REDUCTION OF DISTORTION IN SPEECH SIGNAL TIME COMPRESSION SYSTEMS
3471648 - VOCODER UTILIZING COMPANDING TO REDUCE BACK- GROUND NOISE CAUSED BY QUANTIZING ERRORS
3471781 - APPARATUS FOR DETECTING THE ECHOES OF TRANSMITTED SIGNALS
3484556 - BANDWIDTH COMPRESSION ELIMINATING FREQUENCY TRANSPOSITION AND OVERCOMING PHASE AMBIGUITY
3488445 - ORTHOGONAL FREQUENCY MULTIPLEX DATA TRANSMISSION SYSTEM
3488446 - APPARATUS FOR DERIVING PITCH INFORMATION FROM A SPEECH WAVE
3492429 - INTERPOLATION OF DATA WITH CONTINUOUS SPEECH SIGNALS
3492432 - PULSE AMPLITUDE MODULATION MULTIPLEX VIDEO TRANSMISSION SYSTEM
3493684 - VOCODER EMPLOYING COMPOSITE SPECTRUM- CHANNEL AND PITCH ANALYZER
3496465 - FUNDAMENTAL FREQUENCY DETECTOR
3502986 - ADAPTIVE PREDICTION FOR REDUNDANCY REMOVAL IN DATA TRANSMISSION SYSTEMS
3507999 - SPEECH-NOISE DISCRIMINATOR
3511932 - SELF-OSCILLATING VOCAL TRACT EXCITATION SOURCE
3522383 - BLOCK PRECODING FOR MULTIPLE SPEED DATA TRANSMISSION
3522599 - NONLINEAR GRAY ENCODER USING PIECEWISE LINEAR COMPRESSION
3530248 - SYNTHESIS OF SPEECH FROM CODE SIGNALS
3535454 - FUNDAMENTAL FREQUENCY DETECTOR
3542955 - AUTOMATIC GENERATION OF VOICELESS EXCITATION IN A VOCAL-TRACT SYNTHESIZER
3544894 - APPARATUS FOR PERFORMING COMPLEX WAVE ANALYSIS
3549807 - VOICED FRICATIVE SYNTHESIZER
3553361 - CONDITIONAL REPLENISHMENT VIDEO SYSTEM WITH SAMPLE GROUPING
3553362 - CONDITIONAL REPLENISHMENT VIDEO SYSTEM WITH RUN LENGTH CODING OF POSITION
3555191 - PITCH DETECTOR
3566035 - REAL TIME CEPSTRUM ANALYZER
3582546 - REDUNDANCY REDUCTION SYSTEM FOR USE WITH A SIGNAL HAVING FRAME INTERVALS
3585305 - RANDOM SIGNAL GENERATOR
3603725 - CONDITIONAL REPLENISHMENT VIDEO SYSTEM WITH REDUCED BUFFER MEMORY DELAY
3609244 - CONDITIONAL REPLENISHMENT VIDEO SYSTEM WITH VARIABLE LENGTH ADDRESS CODE
3624302 - SPEECH ANALYSIS AND SYNTHESIS BY THE USE OF THE LINEAR PREDICTION OF A SPEECH WAVE
3629510 - ERROR REDUCTION LOGIC NETWORK FOR HARMONIC MEASUREMENT SYSTEM
3631520 - PREDICTIVE CODING OF SPEECH SIGNALS
3649765 - SPEECH ANALYZER-SYNTHESIZER SYSTEM EMPLOYING IMPROVED FORMANT EXTRACTOR
3662108 - APPARATUS FOR REDUCING MULTIPATH DISTORTION OF SIGNALS UTILIZING CEPSTRUM TECHNIQUE
3700815 - AUTOMATIC SPEAKER VERIFICATION BY NON-LINEAR TIME ALIGNMENT OF ACOUSTIC PARAMETERS
3704345 - CONVERSION OF PRINTED TEXT INTO SYNTHETIC SPEECH
3715512 - ADAPTIVE PREDICTIVE SPEECH SIGNAL CODING SYSTEM
3716789 -
3720786 - CONDITIONAL REPLENISHMENT VIDEO ENCODER WITH PREDICTIVE UPDATING
3740476 - SPEECH SIGNAL PITCH DETECTOR USING PREDICTION ERROR DATA
3752913 - CONDITIONAL REPLENISHMENT VIDEO ENCODER WITH LOW-FREQUENCY COMPENSATION
3761613 - DUAL MODE VIDEO ENCODER
3786188 - SYNTHESIS OF PURE SPEECH FROM A REVERBERANT SIGNAL
3821482 - NOISE SPECTRUM EQUALIZER UTILIZING SPECTRUM INVERSION
3828132 - SPEECH SYNTHESIS BY CONCATENATION OF FORMANT ENCODED WORDS
3855423 - NOISE SPECTRUM EQUALIZER
3873920 - VARIABLE BLOCK LENGTH SYNCHRONIZATION SYSTEM
3909532 - APPARATUS AND METHOD FOR DETERMINING THE BEGINNING AND THE END OF A SPEECH UTTERANCE
3914554 - COMMUNICATION SYSTEM EMPLOYING SPECTRUM FOLDING

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

BELL TELEPHONE LABORATORIES INCORPORATED (CONTINUED)
- 3925616 - APPARATUS FOR DETERMINING THE GLOTTAL WAVEFORM
- 3962535 - CONDITIONAL REPLENISHMENT VIDEO ENCODER WITH SAMPLE GROUPING AND MORE EFFICIENT LINE SYNCHRONIZATION
- 3967067 - SECRET TELEPHONY
- 3982070 - PHASE VOCODER SPEECH SYNTHESIS SYSTEM
- 4015088 - REAL-TIME SPEECH ANALYZER
- 4022974 - ADAPTIVE LINEAR PREDICTION SPEECH SYNTHESIZER
- 4028496 - DIGITAL SPEECH DETECTOR
- 4032711 - SPEAKER RECOGNITION ARRANGEMENT
- 4048443 - DIGITAL SPEECH COMMUNICATION SYSTEM FOR MINIMIZING QUANTIZING NOISE
- 4066842 - METHOD AND APPARATUS FOR CANCELLING ROOM REVERBERATION AND NOISE PICKUP
- 4069395 - ANALOG DEREVERBERATION SYSTEM
- 4069970 - DATA ACCESS CIRCUIT FOR A MEMORY ARRAY
- 4071888 - TELEPHONE MULTILINE AUTOMATIC VOICE ANSWER SYSTEM
- 4087632 - SPEECH RECOGNITION SYSTEM
- 4092493 - SPEECH RECOGNITION SYSTEM
- 4117263 - ANNOUNCEMENT GENERATING ARRANGEMENT UTILIZING DIGITALLY STORED SPEECH REPRESENTATIONS
- 4133976 - PREDICTIVE SPEECH SIGNAL CODING WITH REDUCED NOISE EFFECTS
- 4142066 - SUPPRESSION OF IDLE CHANNEL NOISE IN DELTA MODULATION SYSTEMS
- 4156107 - SPEECH SIGNAL SCRAMBLER
- 4156868 - SYNTACTIC WORD RECOGNIZER
- 4163120 - VOICE SYNTHESIZER
- 4170719 - SPEECH TRANSMISSION SYSTEM
- 4181821 - MULTIPLE TEMPLATE SPEECH RECOGNITION SYSTEM
- 4184049 - TRANSFORM SPEECH SIGNAL CODING WITH PITCH CONTROLLED ADAPTIVE QUANTIZING
- 4220819 - RESIDUAL EXCITED PREDICTIVE SPEECH CODING SYSTEM
- 4277644 - SYNTACTIC CONTINUOUS SPEECH RECOGNIZER
- 4277645 - MULTIPLE VARIABLE THRESHOLD SPEECH DETECTOR
- 4291405 - ERROR REDUCTION SPEECH COMMUNICATION SYSTEM

BRIGHAM YOUNG UNIVERSITY
- 4051331 - SPEECH CODING HEARING AID SYSTEM UTILIZING FORMANT FREQUENCY TRANSFORMATION

CALIFORNIA INSTITUTE OF TECHNOLOGY
- 3860759 - SEISMIC SYSTEM WITH DATA COMPRESSION

CAMBRIDGE RESEARCH AND DEVELOPMENT GROUP
- 3480737 - APPARATUS FOR REDUCING TIME DURATION OF SIGNAL REPRODUCTION
- 3786195 - VARIABLE DELAY LINE SIGNAL PROCESSOR FOR SOUND REPRODUCTION
- 3828361 - SPEECH COMPRESSOR-EXPANDER
- 3838218 - BIFREQUENCY CONTROLLED ANALOG SHIFT REGISTER SPEECH PROCESSOR
- 3846827 - SPEECH COMPRESSOR-EXPANDER WITH SIGNAL SAMPLE ZERO RESET
- 3869708 - SPEECH COMPRESSOR WITH GAP FILLING
- 3936610 - DUAL DELAY LINE STORAGE SOUND SIGNAL PROCESSOR

CAMIN INDUSTRIES CORPORATION
- 3998045 - TALKING SOLID STATE TIMEPIECE

CANADIAN PATENTS AND DEVELOPMENT LIMITED
- 4123711 - SYNCHRONIZED COMPRESSOR AND EXPANDER VOICE PROCESSING SYSTEM FOR RADIO TELEPHONE

CANON KABUSHIKI KAISHA
- 3946504 - UTTERANCE TRAINING MACHINE

CENTER FOR COMMUNICATIONS RESEARCH, INC.
- 3881059 - SYSTEM FOR VISUAL DISPLAY OF SIGNAL PARAMETERS SUCH AS THE PARAMETERS OF SPEECH SIGNALS FOR SPEECH TRAINING PURPOSES

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

CENTER FOR COMMUNICATIONS RESEARCH, INC. (CONTINUED)
4015087 - SPECTROGRAPH APPARATUS FOR ANALYZING AND DISPLAYING SPEECH SIGNALS

CENTIGRAM CORPORATION
4087630 - CONTINUDUS SPEECH RECOGNITION APPARATUS

CENTRE NATIONALE DE LA RECHERCHE SCIENTIFIQUE
3458669 - DEVICES FOR STUDYING OR TREATING ACOUSTIC PHENOMENA

CHIBA COMMUNICATIONS INDUSTRIES, INC.
4034295 - RADIO COMMUNICATION SYSTEM FOR SIMULTANEOUS TELECOMMUNICATION BETWEEN RADIO STATIONS

COGNITRONICS CORPORATION
3534171 - MULTIPLEXING VOICE STORAGE READOUT SYSTEM
3898396 - AUTOMATIC VERIFICATION ANNDUNCER

COMEX SYSTEMS, INC.
3755794 - MESSAGE GENERATOR

COMMUNICATIONS SATELLITE CORPORATION
3666888 - PCM-TV SYSTEM USING A UNIQUE WORD FOR HORIZONTAL TIME SYNCHRONIZATION
3707680 - DIGITAL DIFFERENTIAL PULSE CODE MODULATION SYSTEM
3712959 - METHOD AND APPARATUS FOR DETECTING SPEECH SIGNALS IN THE PRESENCE OF NOISE
3723879 - DIGITAL DIFFERENTIAL PULSE CODE MODEM
3832491 - DIGITAL VOICE SWITCH WITH AN ADAPTIVE DIGITALLY-CONTROLLED THRESHOLD
3878337 - DEVICE FOR SPEECH DETECTION INDEPENDENT OF AMPLITUDE
3890467 - DIGITAL VOICE SWITCH FOR USE WITH DELTA MODULATION
4052568 - DIGITAL VOICE SWITCH

COMPAGNIE INDUSTRIELLE DES TELECOMMUNICATIONS CIT-ALCATEL
3536841 - MULTIPLEXING METHOD AND SYSTEMS
3825694 - CONVERSATION DETECTOR FOR A TELEPHONIC CHANNEL CONCENTRATOR

COMPUTER IMAGE CORPORATION
3662374 - AUTOMATIC GENERATION OF A MOUTH DISPLAY AND ANIMATION OF THE MOUTH IN RESPONSE TO SOUND

CSELT - CENTRO STUDI E LABORATORI TELECOMUNICAZIONI S.P.A.
4187397 - DEVICE FOR AND METHOD OF GENERATING AN ARTIFICIAL SPEECH SIGNAL
4319084 - MULTICHANNEL DIGITAL SPEECH SYNTHESIZER

DAMON CORPORATION
3473121 - SPECTRUM BAND FILTERS

DBX, INC.
4112254 - SIGNAL COMPANDER SYSTEM

DEKTOR COUNTERINTELLIGENCE AND SECURITY
3971034 - PHYSIOLOGICAL RESPONSE ANALYSIS METHOD AND APPARATUS

DIALOG SYSTEMS, INC.
4038503 - SPEECH RECOGNITION APPARATUS
4227176 - CONTINUOUS SPEECH RECOGNITION METHOD
4227177 - CONTINUOUS SPEECH RECOGNITION METHDD
4241329 - CONTINUOUS SPEECH RECOGNITION METHDD FOR IMPROVING FALSE ALARM RATES

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

EDINEN CENTAR PO PHYSIKA
4278838 - METHOD OF ANO DEVICE FOR SYNTHESIS OF SPEECH FROM PRINTED TEXT

EDUTRON, INCORPORATED
3882538 - MULTIPLE ACCESS MESSAGE RETRIEVAL SYSTEM

EIKONIX CORPORATION
3803358 - VOICE SYNTHESIZER WITH DIGITALLY STORED DATA WHICH HAS A NON-LINEAR RELATIONSHIP TO THE ORIGINAL INPUT DATA

ELECTRONIC MUSIC STUDIOS LONDON LIMITED
3974334 - WAVEFORM PROCESSING

E-SYSTEMS, INC.
3697699 - DIGITAL SPEECH SIGNAL SYNTHESIZER
3703609 - NOISE SIGNAL GENERATOR FOR A DIGITAL SPEECH SYNTHESIZER
4076958 - SIGNAL SYNTHESIZER SPECTRUM CONTOUR SCALER
4121058 - VOICE PROCESSOR

FARRINGTON MANUFACTURING COMPANY
3532834 - SPEECH GATE
3557310 - SPEECH RECOGNIZER

FEDERAL SCREW WORKS
4128737 - VOICE SYNTHESIZER
4130730 - VOICE SYNTHESIZER
4215240 - PORTABLE VOICE SYSTEM FOR THE VERBALLY HANDICAPPED
4264783 - DIGITAL SPEECH SYNTHESIZER HAVING AN ANALOG DELAY LINE VOCAL TRACT
4301328 - VOICE SYNTHESIZER

FFTURING COMPANY
3511260 - DISTRIBUTOR VACUUM AOVANCE VALVE ASSEMBLY

FIRST NATIONAL BANK OF BOSTON
3919479 - BROADCAST SIGNAL IDENTIFICATION SYSTEM

FORD INDUSTRIES, INC.
3864519 - SPEECH-GAP-RESPONSIVE CONTROL APPARATUS

FUJITSU LIMITED
3573802 - BIPOLAR ANALOG-TO-DIGITAL FEEDBACK ENCODER UTILIZING A REVERSIBLE SHIFT REGISTER

FUJI XEROX CO., LTD.
4054749 - METHOD FOR VERIFYING IDENTITY OR DIFFERENCE BY VOICE
4060694 - SPEECH RECOGNITION METHOD AND APPARATUS ADAPTEO TO A PLURALITY OF DIFFERENT SPEAKERS
4060695 - SPEAKER IOENTIFICATION SYSTEM USING PEAK VALUE ENVELOP LINES OF VOCAL WAVEFORMS
4078154 - VOICE RECOGNITION SYSTEM USING LOCUS OF CENTROID OF VOCAL FREQUENCY SPECTRA
4100370 - VOICE VERIFICATION SYSTEM BASED ON WORD PRONUNCIATION

GENERAL DYNAMICS CORPORATION
3482101 - ELECTRO-OPTICAL SIGNAL PROCESSING
3483512 - PATTERN RECOGNITION SYSTEM
3505601 - SAMPLED CLIPPED SPEECH TDM TRANSMISSION SYSTEM

GENERAL ELECTRIC COMPANY
3549806 - FUNDAMENTAL PITCH FREQUENCY SIGNAL EXTRACTION SYSTEM FOR COMPLEX SIGNALS
3560852 - ELECTRICAL WAVEFORM ANALYZER AND DATA TABULATION SYSTEM COMBINING DIGITAL AND MULTIPLEXING TECHNIQUES

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

GENERAL ELECTRIC CDMPANY (CONTINUED)
3763328 - GAP ELIMINATIDN IN SCANNED RECDRDINGS
3882458 - VDICE DPERATED SWITCH INCLUDING APPARATUS FDR ESTABLISHING A VARIABLE THRESHDLD NDISE LEVEL

GENERAL SIGNAL CORPDRATION
3955050 - SYSTEM FOR AUDIBLY RECDGNIZING AN AURALLY UNCLASSIFIABLE SIGNAL
3988546 - SYSTEM FDR AUDIBLY RECOGNIZING AN AURALLY UNCLASSIFIABLE SIGNAL

GDETZEWERKE FRIEDRICH GOETZE AG
3519281 - GASKET

GRAPHIC SCIENCES, INC.
3761610 - HIGH SPEED FASCIMILE SYSTEMS

GRAPHIC TRANSMISSION SYSTEMS INC.
3495032 - BANDWIDTH REDUCTIDN SYSTEM

GRETAG AKTIENGESELLSCHAFT
3909533 - METHDD AND APPARATUS FDR THE ANALYSIS AND SYNTHESIS OF SPEECH SIGNALS

GTE AUTDMATIC ELECTRIC LABDRATORIES INCDRPORATED
4025720 - DIGITAL BIT RATE CONVERTER
4255618 - DIGITAL INTERCEPT RECDRDER/ANNDUNCER SYSTEM

GTE LABDRATORIES INCDRPDRATED
3435229 - SIGNAL TRANSMISSIDN SYSTEMS
4016556 - DPTICALLY ENCODED ACDUSTIC TD DIGITAL TRANSDUCER

GTE SYLVANIA INCDRPDRATED
3541264 - APPARATUS FDR DELETING A PDRTION OF A SIGNAL
3634668 - LDG SPECTRUM DECDDING UTILIZING SYMMETRY
3681530 - METHDD AND APPARATUS FDR SIGNAL BANDWIDTH CDMPRESSION UTILIZING THE FOURIER TRANSFDRM OF THE LDGARITHM DF THE FREQUENCY SPECTRUM MAGNITUDE
3936611 - TIME CDMPRESSIDN SCANNER

HAJIME INDUSTRIES, LTD.
4318080 - DATA PRDCESSING SYSTEM UTILIZING ANALOG MEMDRIES HAVING DIFFERENT DATA PRDCESSING CHARACTERISTICS

HARRIS CDRPDRATIDN
4187396 - VOICE DETECTOR CIRCUIT

HAYWARD RESEARCH, INC.
3976842 - ANALOG RATE CHANGER

HITACHI, LTD.
3532821 - SPEECH SYNTHESIZER
3581192 - FREQUENCY SPECTRUM ANALYZER WITH DISPLAYABLE CDLDRED SHIFTABLE FREQUENCY SPECTRDGRAM
3634759 - FREQUENCY SPECTRUM ANALYZER WITH A REAL TIME DISPLAY DEVICE
3892919 - SPEECH SYNTHESIS SYSTEM
3928722 - AUDID MESSAGE GENERATING APPARATUS USED FOR QUERY-REPLY SYSTEM
3934094 - FREQUENCY BAND CDNVERTER
3949175 - AUDID SIGNAL TIME-DURATION CDNVERTER
4088838 - VDICE RESPONSE SYSTEM
4227046 - PRE-PRDCESSING SYSTEM FOR SPEECH RECDGNITIDN
4283601 - PREPROCESSING METHOD AND DEVICE FDR SPEECH RECDGNITIDN DEVICE

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

HONEYWELL INC.
3430145 - SEPARATION OF HARMONIC BANDS OF A SIGNAL BY INSERTING AMPLITUDE RELATED PULSES BETWEEN SAMPLING PULSES
3576948 - SYSTEM FOR RECORDING HIGH FREQUENCY SIGNALS ON A RECORDER HAVING A LOWER FREQUENCY RESPONSE

HONEYWELL INFORMATION SYSTEMS INC.
3696402 - DIGITAL FREQUENCY DIVIDER
3976844 - DATA COMMUNICATION SYSTEM FOR TRANSMITTING DATA IN COMPRESSED FORM

HUGHES AIRCRAFT COMPANY
3423526 - NARROW-BAND TELEVISION
3453382 - MULTIPLE INTERLACE TELEVISION SYSTEM
3463876 - TV BANDWIDTH REDUCTION
4092603 - SYSTEM FOR OBTAINING PULSE COMPRESSION IN THE FREQUENCY DOMAIN

IIT RESEARCH INSTITUTE
3527898 - SIGNAL COMPRESSION OR EXPANSION SYSTEM USING VARIABLE AZIMUTH MAGNETIC RECORDING

INDEPENDENT BROADCASTING AUTHORITY
4271483 - DELAY CIRCUITS

INDIANA UNIVERSITY FOUNDATION
4063035 - DEVICE FOR VISUALLY DISPLAYING THE AUDITORY CONTENT OF THE HUMAN VOICE

INDUSTRIAL RESEARCH PRODUCTS INC.
3681756 - SYSTEM FOR FREQUENCY MODIFICATION OF SPEECH AND OTHER AUDIO SIGNALS

IN-MAR ELECTRONICS
4271331 - ANALOG PROCESSING SYSTEM FOR REAL-TIME CONVERSION OF THE FREQUENCY OF ANALOG SIGNALS

INTEGRATED ELECTRONICS CORPORATION
3431356 - APPARATUS AND METHOD FOR RECONSTRUCTING SPEECH

INTELLIGENT INSTRUMENTS INC.
3432657 - X-RAY HELICAL SCANNING MEANS FOR DISPLAYING AN IMAGE OF AN OBJECT WITHIN THE BODY BEING SCANNED

INTERNATIONAL BUSINESS MACHINES CORPORATION
3431355 - DEVICE FOR EXCITATION CONTROLLED SMOOTHING OF THE SPECTRUM-CHANNEL SIGNALS OF A VOCODER
3450838 - DEVICE MODIFYING PITCH FREQUENCY AND/OR ARTICULATION SPEED FOR NATURAL SPEECH
3450989 - FREQUENCY ANALYZER FOR DETECTION OF ENERGY
3466394 - VOICE VERIFICATION SYSTEM
3478267 - RECEPTION OF PULSES TRANSMITTED AT N TIMES THE NYQUIST RATE
3479460 - SPEECH ANALYSIS SYSTEM
3499989 - SPEECH ANALYSIS THROUGH FORMANT DETECTION
3499990 - SPEECH ANALYZING SYSTEM
3509281 - VOICING DETECTION SYSTEM
3513260 - SPEECH PRESENCE DETECTOR
3513266 - MAGNETIC RECORDING SYSTEM FOR WIDEBAND SIGNAL MULTIPLEXING BY FREQUENCY MODULATION
3521241 - TWO-DIMENSIONAL DATA COMPRESSION
3564142 - METHOD OF MULTIPLEX SPEECH SYNTHESIS
3571515 - VOICE ANALYSIS AND RECOVERY SYSTEM
3600516 - VOICING DETECTION AND PITCH EXTRACTION SYSTEM
3662348 - MESSAGE ASSEMBLY AND RESPONSE SYSTEM
3770892 - CONNECTED WORD RECOGNITION SYSTEM
3813485 - SYSTEM FOR COMPRESSION OF DIGITAL DATA
3916105 - PITCH PEAK DETECTION USING LINEAR PREDICTION
3925761 - BINARY REFERENCE MATRIX FOR A CHARACTER RECOGNITION MACHINE

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

INTERNATIONAL BUSINESS MACHINES CORPORATION (CONTINUED)
- 3969698 - CLUSTER STORAGE APPARATUS FOR POST PROCESSING ERROR CORRECTION OF A CHARACTER RECOGNITION MACHINE
- 3969700 - REGIONAL CONTEXT MAXIMUM LIKELIHOOD ERROR CORRECTION FOR OCR, KEYBOARD, AND THE LIKE
- 4000565 - DIGITAL AUDIO OUTPUT DEVICE
- 4071903 - AUTOCORRELATION FUNCTION FACTOR GENERATING METHOD AND CIRCUITRY THEREFOR
- 4091242 - HIGH SPEED VOICE REPLAY VIA DIGITAL DELTA MODULATION
- 4142071 - QUANTIZING PROCESS WITH DYNAMIC ALLOCATION OF THE AVAILABLE BIT RESOURCES AND DEVICE FOR IMPLEMENTING SAID PROCESS
- 4216354 - PROCESS FOR COMPRESSING DATA RELATIVE TO VOICE SIGNALS AND DEVICE APPLYING SAID PROCESS
- 4228322 - DECREASING TIME DURATION OF RECORDED SPEECH
- 4267407 - METHOD AND APPARATUS FOR THE TRANSMISSION OF SPEECH SIGNALS

INTERNATIONAL COMMUNICATION SCIENCES
- 4058676 - SPEECH ANALYSIS AND SYNTHESIS SYSTEM

INTERNATIONAL COMPUTERS LIMITED
- 4075423 - SOUND ANALYZING APPARATUS
- 4075424 - SPEECH SYNTHESIZING APPARATUS
- 4092495 - SPEECH SYNTHESIZING APPARATUS

INTERNATIONAL STANDARD ELECTRIC CORPORATION
- 3471791 - SYLLABIC DETECTOR SYSTEM
- 3551588 - VOCODER FILTER SYSTEM
- 3647978 - SPEECH RECOGNITION APPARATUS
- 3825685 - HELIUM ENVIRONMENT VOCODER
- 3875341 - SYSTEM FOR TRANSFERRING WIDEBAND SOUND SIGNALS
- 3894190 - SYSTEM FOR TRANSFERRING WIDE-BAND SOUND SIGNALS
- 3946162 - SYSTEM FOR TRANSFERRING WIDEBAND SOUND SIGNALS

INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION
- 3509280 - ADAPTIVE SPEECH PATTERN RECOGNITION SYSTEM
- 3678507 - CODE COMPRESSION SYSTEM
- 3750024 - NARROW BAND DIGITAL SPEECH COMMUNICATION SYSTEM
- 3832493 - DIGITAL SPEECH DETECTOR
- 3975587 - DIGITAL VOCODER
- 3979557 - SPEECH PROCESSOR SYSTEM FOR PITCH PERIOD EXTRACTION USING PREDICTION FILTERS
- 4121051 - SPEECH SYNTHESIZER
- 4270026 - INTERPOLATOR APPARATUS FOR INCREASING THE WORD RATE OF A DIGITAL SIGNAL OF THE TYPE EMPLOYED IN DIGITAL TELEPHONE SYSTEMS
- 4270027 - TELEPHONE SUBSCRIBER LINE UNIT WITH SIGMA-DELTA DIGITAL TO ANALOG CONVERTER
- 4302631 - DECIMATOR APPARATUS FOR DECREASING THE WORD RATE OF A DIGITAL SIGNAL OF THE TYPE EMPLOYED IN DIGITAL TELEPHONE SYSTEMS

INTERSTATE ELECTRONICS CORP.
- 4292470 - AUDIO SIGNAL RECOGNITION COMPUTER
- 4297528 - TRAINING CIRCUIT FOR AUDIO SIGNAL RECOGNITION COMPUTER

IOWA STATE UNIVERSITY RESEARCH FOUNDATION INC.
- 3974336 - SPEECH PROCESSING SYSTEM

KABUSHIKI KAISHA KAWAI SAKKI SUSAKUSHO
- 4236434 - APPARATUS FOR PRODUCING A VOCAL SOUND SIGNAL IN AN ELECTRONIC MUSICAL INSTRUMENT

KABUSHIKI KAISHA SANKYO SEIKI SEISAKUSHO
- 3806666 - RECORDED SIGNAL TRANSMISSION SYSTEM

KAHN RESEARCH LABORATORIES, INC.
- 3684838 - SINGLE CHANNEL AUDIO SIGNAL TRANSMISSION SYSTEM

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

KAHN RESEARCH LABORATORIES, INC. (CONTINUED)
3696298 - AUDIO SIGNAL TRANSMISSION SYSTEM AND METHOD

KAY ELEMETRICS CORP.
4276445 - SPEECH ANALYSIS APPARATUS

KEW, INCORPORATED
3940789 - MULTICOLOR DISPLAY FOR THE VISUAL-AESTHETIC PORTRAYAL OF ELECTRIC SIGNALS

KOKUSAI DENSHIN DENWA KABUSHIKI KAISHA
3828133 - SPEECH-QUALITY IMPROVING SYSTEM UTILIZING THE GENERATION OF HIGHER HARMONIC COMPONENTS
4149039 - FREQUENCY BAND COMPRESSION OF FDM USING TIME EXPANSION
4282406 - ADAPTIVE PITCH DETECTION SYSTEM FOR VOICE SIGNAL
4303803 - DIGITAL SPEECH INTERPOLATION SYSTEM

LARYNOGOGRAPH LIMITED
4139732 - APPARATUS FOR SPEECH PATTERN DERIVATION

LA SOUDURE ELECTRIQUE AUTOGENE PROCEDES ARCOS
3511960 - ELECTRIC ARC WELDING

LGZ LANDIS + GYR ZUG AG
4297533 - DETECTOR TO DETERMINE THE PRESENCE OF AN ELECTRICAL SIGNAL IN THE PRESENCE OF NOISE OF PREDETERMINED CHARACTERISTICS
4307380 - TRANSMITTING SIGNALS OVER ALTERNATING CURRENT POWER NETWORKS

LICENTIA PATENT-VERWALTUNGS-GMBH
4161625 - METHOD FOR DETERMINING THE FUNDAMENTAL FREQUENCY OF A VOICE SIGNAL

LISTENING INCORPORATED
3610831 - SPEECH RECOGNITION APPARATUS
3611411 - SPECTRUM ANALYZING RECORDER

LITTON SYSTEMS INC.
3590164 - TRANSMISSION SYSTEM FOR TWO-LEVEL SIGNALS PROVIDING REDUCED BANDWIDTH REQUIREMENTS

LOCKHEED CORPORATION
3524932 - PHYSIOLOGICAL COMMUNICATIONS SYSTEM
3638121 - NON-PERIODIC ENERGY COMMUNICATION SYSTEM CAPABLE OF OPERATING AT LOW SIGNAL-TO-NOISE RATIOS

LOCKHEED MISSILES + SPACE COMPANY, INC.
4044204 - DEVICE FOR SEPARATING THE VOICED AND UNVOICED PORTIONS OF SPEECH
4091237 - BI-PHASE HARMONIC HISTOGRAM PITCH EXTRACTOR
4130734 - ANALOG AUDIO SIGNAL BANDWIDTH COMPRESSOR

LONG ENTERPRISES
3965298 - DEEP SEA DIVING SPEECH CONVERTER

LUCAS INDUSTRIES LIMITED
3996554 - DATA TRANSMISSION SYSTEM

MAGNAVOX COMPANY
3624301 - SPEECH SYNTHESIZER UTILIZING STORED PHONEMES

MARCONI COMPANY LIMITED
3566024 - BANDWIDTH REDUCTION FOR VIDEO SIGNALS OF LOW LUMINANCE

DRGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

MARTIN-MARIETTA CDRPORATIDN
4173014 - APPARATUS ANO METHOD FDR RECEIVING DIGITAL DATA AT A FIRST RATE ANO OUTPUTTING THE DATA AT A DIFFERENT RATE

MARVIN GLASS & ASSOCIATES
4326710 - TALKING ELECTRONIC GAME

MASSACHUSETTS INSTITUTE DF TECHNDLDGY
3471644 - VDICE VOCOOING ANO TRANSMITTING SYSTEM

MASTER SPECIALTIES COMPANY
3789144 - METHDO FDR COMPRESSING ANO SYNTHESIZING A CYCLIC ANALDG SIGNAL BASED UPDN HALF CYCLES

MATSUSHITA ELECTRIC INOUSTRIAL CD., LTD.
3592969 - SPEECH ANALYZING APPARATUS
3676862 - SIGNAL CONVERSIDN SYSTEM WITH TIME BASE CDMPRESSION OF THE INPUT DATA
3725592 - AMPLITUDE QUANTIZED SIGNAL TRANSMISSION METHOO
3816660 - SPEECH SYNTHESIZER WITH GLIOE CDNTROL
3909513 - FACSIMILE SYSTEM

MCOONNELL DDUGLAS CORPORATION
4301333 - SPEECH COMPRESSIDN

MEILINK STEEL SAFE CDMPANY
3493676 - TIME LAPSE VIOED RECDRDER

MELPAR, INC.
3423530 - SPEECH SYNTHESIZER HAVING Q MULTIPLIER
3470468 - SYNTHESIS ANO WAVE GENERATIDN WITH COMPACTLY CARRIEO WAVEFDRMS

MELVILLE CLARK ASSDCIATES
3697703 - SIGNAL PROCESSING UTILIZING BASIC FUNCTIONS

MESSERSCHMITT-BDLKDW-BLDHM GMBH
3670248 - METHOO ANO APPARATUS FDR CONVERTING MULTI-PULSE COMMANOS INTD COMMAND UNITS FDR TRANSMISSION

METROSDNICS, INC.
4020286 - SIGNAL ANALYSIS APPARATUS FDR AMPLITUDE STATISTICS

MINNESOTA MINING ANO MANUFACTURING COMPANY
3510577 - FACSIMILE SYSTEM WITH TWD SPEED MAGNETIC STORAGE
4145683 - SINGLE TRACK AUDIO-OIGITAL RECDROER ANO CIRCUIT FDR USE THEREIN HAVING ERRDR CDRRECTION

MOTDRDLA INC.
3467783 - SPEECH BANDWIDTH REOUCTION BY SAMPLING 1/N CYCLES, STDRING THE SAMPLES, ANO REAOING THE SAMPLES DUT AT 1/N THE SAMPLING RATE
4006457 - LDGIC CIRCUITRY FDR SELECTIDN DF DEDICATEO REGISTERS
4164626 - PITCH DETECTDR ANO METHOD THEREDF
4191853 - SAMPLEO DATA FILTER WITH TIME SHARED WEIGHTERS FDR USE AS AN LPC ANO SYNTHESIZER

NARCO SCIENTIFIC INDUSTRIES, INC.
4044309 - AUTDMATIC SQUELCH CIRCUIT WITH HYSTERESIS

NATIONAL BOARO DF MEOICAL EXAMINERS
4032897 - INTERACTIVE AUDIDVISUAL DISPLAY SYSTEM

ORGANIZATIDNAL PATENTING (1/69- 6/82) - - ALPHA LISTING

NATIONAL RESEARCH OEVELOPMENT CORPORATION
- 3742146 - VDWEL RECOGNITION APPARATUS
- 4200810 - METHDD AND APPARATUS FOR AVERAGING AND STRETCHING PERIODIC SIGNALS

NCR CORPORATION
- 4021616 - INTERPOLATING RATE MULTIPLIER
- 4053710 - AUTOMATIC SPEAKER VERIFICATION SYSTEMS EMPLOYING MOMENT INVARIANTS

NIPPDN COLUMBIA KABUSHIKIKAISHA
- 3742395 - VARIABLE BANDWIDTH APPARATUS FOR TRANSMISSION SYSTEM

NIPPONDENSD CO., LTD.
- 4137553 - METHOD ANO APPARATUS FOR MAGNETICALLY RECORDING VEHICLE RUNNING CONDITIDNS

NIPPDN ELECTRIC CO., LTO.
- 3449675 - SIGNAL TRANSMISSION SYSTEM WITH REOUNOANCY REDUCTIDN
- 3573364 - BAND-COMPRESSED SIGNAL TRANSMISSION SYSTEM
- 3594509 - OELTA MDDULATOR APPARATUS
- 3617636 - PITCH OETECTION APPARATUS
- 3676600 - NONLINEAR ENCODER
- 3816722 - COMPUTER FOR CALCULATING THE SIMILARITY BETWEEN PATTERNS AND PATTERN RECOGNITION SYSTEM COMPRISING THE SIMILARITY COMPUTER
- 4001505 - SPEECH SIGNAL PRESENCE DETECTOR
- 4049913 - SYSTEM FOR RECOGNIZING SPEECH CONTINUOUSLY SPOKEN WITH NUMBER OF WORO OR WOROS PRESELECTEO
- 4059725 - AUTOMATIC CONTINUOUS SPEECH RECDGNITION SYSTEM EMPLDYING DYNAMIC PROGRAMMING
- 4157457 - FREQUENCY ANALYZER COMPRISING A OIGITAL BAND-PASS AND A OIGITAL LDW-PASS FILTER SECTION BOTH OPERABLE IN A TIME-OIVISION FASHION
- 4158750 - SPEECH RECOGNITION SYSTEM WITH OELAYEO OUTPUT
- 4167653 - AOAPTIVE SPEECH SIGNAL OETECTOR
- 4179710 - PREOICTIVE ENCODER WITH A NON-LINEAR DUANTIZING CHARACTERISTIC
- 4191858 - BLOCK DIGITAL PROCESSING SYSTEM FOR NDNUNIFORMLY ENCOOEO OIGITAL WORDS
- 4239936 - SPEECH RECOGNITIDN SYSTEM
- 4247947 - MDBILE RAOIO OATA COMMUNICATION SYSTEM
- 4256924 - DEVICE FOR RECOGNIZING AN INPUT PATTERN WITH APPRDXIMATE PATTERNS USEO FOR REFERENCE PATTERNS ON MAPPING
- 4282403 - PATTERN RECDGNITION WITH A WARPING FUNCTION OECIDED FOR EACH REFERENCE PATTERN BY THE USE DF FEATURE VECTOR COMPDNENTS DF A FEW CHANNELS
- 4282405 - SPEECH ANALYZER COMPRISING CIRCUITS FOR CALCULATING AUTOCORRELATION COEFFICIENTS FORWARDLY AND BACKWARDLY
- 4286115 - SYSTEM FDR RECOGNIZING WDRDS CONTINUDUSLY SPOKEN ACCORDING TD A FORMAT
- 4301329 - SPEECH ANALYSIS AND SYNTHESIS APPARATUS
- 4319221 - SIMILARITY CALCULATOR COMPRISING A BUFFER FDR A SINGLE INPUT PATTERN FEATURE VECTOR TO BE PATTERN MATCHEO WITH REFERENCE PATTERNS
- 4326101 - SYSTEM FOR RECOGNIZING A WORO SEDUENCE BY OYNAMIC PROGRAMMING ANO BY THE USE OF A STATE TRANSITION OIAGRAM

NIPPDN GAKKI SEIZO KABUSHIKI KAISHA
- 3913442 - VOICING FOR A COMPUTOR ORGAN

NIPPDN HDSO KYDKAI
- 3752912 - SYSTEM FOR CONVERTING FACSIMILE SIGNALS

NIPPDN TELEGRAPH AND TELEPHONE PUBLIC CORPORATION
- 3621397 - PCM TRANSMISSION SYSTEM
- 3662115 - AUOIO RESPDNSE APPARATUS USING PARTIAL AUTOCORRELATION TECHNIDUES
- 4052563 - MULTIPLEX SPEECH TRANSMISSION SYSTEM WITH SPEECH ANALYSIS-SYNTHESIS
- 4074069 - METHDD ANO APPARATUS FOR JUOGING VDICED AND UNVOICEO CONDITIONS OF SPEECH SIGNAL
- 4081605 - SPEECH SIGNAL FUNOAMENTAL PERIOO EXTRACTOR
- 4228545 - RECEIVER OEVICE HAVING A FUNCTION FOR SUPPRESSING TRANSIENT NDISES DURING ABRUPT INTERRUPTIONS

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

NISSAN MOTOR COMPANY, LIMITED
4310825 - VOICE WARNING SYSTEM FOR AN AUTOMOTIVE VEHICLE

NORLIN MUSIC, INC.
4280387 - FREQUENCY FOLLOWING CIRCUIT

NORTH ELECTRIC COMPANY
3949299 - SIGNAL CODING FOR TELEPHONE COMMUNICATION SYSTEM

NORTHROP CORPORATION
3739083 - OIGITAL SYSTEM FOR BAND WIOTH REDUCTION OF VIDEO SIGNALS
4064363 - VOCODER SYSTEMS PROVIOING WAVE FORM ANALYSIS AND SYNTHESIS USING FOURIER TRANSFORM REPRESENTATIVE SIGNALS

OCEAN SYSTEMS INCORPORATED
3485960 - ROTARY MAGNETIC HEAO RECORD AND PLAYBACK SYSTEM FOR RENDERING UNINTELLIGIBLE SPEECH

OCEAN TECHNOLOGY, INC.
4232194 - VOICE ENCRYPTION SYSTEM

OCTRONIX, INC.
3499996 - BANDWIDTH COMPRESSOR AND EXPANDER
3541266 - BANDWIDTH CDMPRESSOR AND EXPANDER
3559067 - MULTILEVEL WEIGHTED CARRIER ENCODED OIGITAL OATA TRANSMISSION SYSTEM

OKLAHOMA STATE UNIVERSITY
3539726 - SYSTEM FOR STORING COCHLEAR PROFILES

ORBAN ASSOCIATES, INC.
4249042 - MULTIBAND CROSS-COUPLED COMPRESSOR WITH OVERSHOOT PROTECTION CIRCUIT

PARTICLE MEASURING SYSTEMS, INC.
3941982 - METHOD AND APPARATUS FOR TWO-DIMENSIONAL DATA ACQUISITION

PATELHOLD PATENTVERWERTUNGS- + ELEKTRO-HOLDING AG.
4071707 - PROCESS AND APPARATUS FOR IMPROVING THE UTILIZATION OF TRANSMISSON CHANNELS THROUGH THINNING OUT SECTIONS OF THE SIGNAL BAND

PERCEPTION TECHNDLOGY CORPORATION
3639691 - CHARACTERIZING AUDIO SIGNALS

PERIPHONICS CORPORATION
3743793 - ANALOG SIGNAL RECORDING AND PLAYBACK METHOD AND SYSTEM
3745264 - ANALOG SIGNAL RECORDING AND PLAYBACK METHOD AND SYSTEM

PHDNPLEX CORPORATION
3641496 - ELECTRONIC VOICE ANNUNCIATING SYSTEM HAVING BINARY DATA CONVERTED INTO AUDIO REPRESENTATIONS

PIONEER ELECTRONIC CORPORATION
4027102 - VDICE VERSUS PULSED TONE SIGNAL DISCRIMINATION CIRCUIT

PKM CDRPORATION
3723667 - APPARATUS FDR SPEECH COMPRESSION

POLARDID CDRPORATION
3584143 - FACSIMILE DUPLICATION OF DOCUMENTS BY MEANS OF DIGITAL SIGNALS

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

POST OFFICE
4229622 - MULTIPLEXING SPEECH SIGNALS

PROPORTIONAL ASSIGNMENTS
3794753 - SYNTHESIS OF SPEECH FROM A MAGNETIC TAPE MATRIN STORAGE OF PHONETIC SEGMENTS

QUAKER OATS COMPANY
4318245 - VOCALIZING APPARATUS

RADIATION INCORPORATED
3478266 - DIGITAL DATA REDUNDANCY REDUCTION METHODS AND APPARATUS

RCA CORPORATION
3435134 - DIGITAL TELEVISION DATA COMPRESSION SYSTEM
3575555 - SPEECH SYNTHESIZER PROVIDING SMOOTH TRANSISTION BETWEEN ADJACENT PHONEMES
3588353 - SPEECH SYNTHESIZER UTILIZING TIMEWISE TRUNCATION OF ADJACENT PHONEMES TO PROVIDE SMOOTH FORMANT TRANSITION
3588363 - WORD RECOGNITION SYSTEM FOR VOICE CONTROLLER
3619509 - BROAD SLOPE DETERMINING NETWORK

REFLECTONE, INC.
4241235 - VOICE MODIFICATION SYSTEM

REGENTS OF UNIVERSITY OF CALIFORNIA
4275270 - SPEECH DETECTOR FOR USE IN AN ADAPTIVE HYBRID CIRCUIT

RESEARCH CORPORATION
3510640 - METHOD AND APPARATUS FOR INTERPOLATION AND CONVERSION OF SIGNALS SPECIFIED BY REAL AND COMPLEX ZEROS
3676595 - VOICED SOUND DISPLAY

ROCKLAND SYSTEMS CORPORATION
3808370 - SYSTEM USING ADAPTIVE FILTER FOR DETERMINING CHARACTERISTICS OF AN INPUT

ROCKWELL INTERNATIONAL CORPORATION
4038495 - SPEECH ANALYZER/SYNTHESIZER USING RECURSIVE FILTERS
4081607 - KEYWORD DETECTION IN CONTINUOUS SPEECH USING CONTINUOUS ASYNCHRONOUS CORRELATION

ROTARY CLUB GENEVE SUD
3937884 - DECODING EQUIPMENT ESPECIALLY FOR A TYPEWRITER INTENDED FOR HANDICAPPED PERSONS

SANDARD TELEPHONES + CABLES LIMITED
3546584 - APPARATUS FOR ANALYZING A COMPLEX WAVEFORM CONTAINING PITCH SYNCHRONOUS INFORMATION

SANDERS ASSOCIATES INC.
3504352 - TIME COMPRESSION SYSTEM
3621150 - SPEECH PROCESSOR FOR CHANGING VOICE PITCH

SANTA RITA TECHNOLOGY, INC.
3432618 - METHOD AND SYSTEM OF ANALYZING THE INNER EAR
3469034 - NEURAL-LIKE ANALYZING SYSTEM
3483325 - SPEECH PROCESSING SYSTEM
3510588 - SPEECH SYNTHESIS METHODS AND APPARATUS

SANYO ELECTRIC CO., LTD.
4210781 - SOUND SYNTHESIZING APPARATUS

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

SCITRONIX CORPORATION
3836717 - SPEECH SYNTHESIZER RESPONSIVE TO A DIGITAL COMMAND INPUT
4130729 - COMPRESSED SPEECH SYSTEM
4140876 - COMPRESSED SPEECH SYSTEM AND PREDICTOR

SCOPE INCORPORATED
3582559 - METHOD AND APPARATUS FOR INTERPRETATION OF TIME- VARYING SIGNALS
3812291 - SIGNAL PATTERN ENCODER AND CLASSIFIER

SCOTT INSTRUMENTS COMPANY
4292469 - VOICE PITCH DETECTOR AND DISPLAY

SHARP KABUSHIKI KAISHA
4179584 - SYNTHETIC-SPEECH CALCULATORS
4185169 - SYNTHETIC-SPEECH CALCULATORS
4185170 - PROGRAMMABLE SYNTHETIC-SPEECH CALCULATORS OR MICRO COMPUTERS
4211892 - SYNTHETIC-SPEECH CALCULATORS
4266096 - AUDIBLE OUTPUT DEVICE FOR TALKING TIMEPIECES, TALKING CALCULATORS AND THE LIKE
4276444 - SYNTHETIC-SPEECH CALCULATORS
4282404 - SYNTHETIC-SPEECH CALCULATORS
4328562 - MEANS FOR DISPLAYING AT LEAST TWO DIFFERENT WORDS AND FOR PROVIDING INDEPENDENT PRONUNCIATIONS OF THESE WORDS
4334298 - WIRELESS SPEECH-SYNTHESIZER TIMEPIECE

SIEMENS AKTIENGESELLSCHAFT
3495188 - SINGLE-SIDEBAND CARRIER FREQUENCY SYSTEM UTILIZING A PREMODULATION STAGE FOR PROVIDING THE BASE PRIMARY GROUP
4318188 - SEMICONDUCTOR DEVICE FOR THE REPRODUCTION OF ACOUSTIC SIGNALS

SIGNATECTION INC.
3441850 - SPECTRUM ANALYSIS APPARATUS

SIGNATRON, INC.
3527885 - DATA COMPACTION SYSTEM WITH STAGGERED SCANNING AND ADAPTIVE REDUNDANCY REMOVAL

SINGER COMPANY
3632877 - HELIUM VOICE TRANSLATOR UTILIZING EITHER A GLOTTAL SYNCHRONOUS OR A MEMORY FULL RESET SIGNAL
4125898 - DIGITALLY SHAPED NOISE GENERATING SYSTEM
4281994 - AIRCRAFT SIMULATOR DIGITAL AUDIO SYSTEM

SINGER-GENERAL PRECISION INC.
3529086 - APPARATUS FOR THE DIGITAL GENERATION OF ACOUSTIC WAVEFORMS
3578912 - SOUND GENERATOR

SOCIETA ITALIANA TELECOMUNICAZIONI SIEMENS S.P.A.
3985956 - METHOD OF AND MEANS FOR DETECTING VOICE FREQUENCIES IN TELEPHONE SYSTEM

SOCIETE ANONYME DE TELECOMMUNICATIONS
4004101 - METHOD AND DEVICE FOR DETECTING OCCUPANCY OF TELECOMMUNICATION CHANNELS
4319360 - PREDICTOR STAGE FOR A DIGIT RATE REDUCTION SYSTEM

SOCIETE LANNIONNAISE D ELECTRONIQUE SLE-CITEREL
3881099 - PSEUDO-RANDOM BINARY SEQUENCE GENERATOR

SONY CORPORATION
3746781 - VIDEO SIGNAL PHASE REGULATING SYSTEM
3873778 - SIGNAL PROCESSING SYSTEM
4138694 - VIDEO SIGNAL RECORDER/REPRODUCER FOR RECORDING AND REPRODUCING PULSE SIGNALS

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

SONY CORPORATION (CONTINUED)
4141039 - RECORDER MEMORY WITH VARIABLE READ AND WRITE RATES
4206440 - ENCODING FOR ERROR CORRECTION OF RECORDED DIGITAL SIGNALS
4206476 - CONTROL CIRCUIT FOR USE WITH A TIME-COMPRESSION/TIME-EXPANSION SYSTEM IN A PULSE SIGNAL RECORD/PLAYBACK DEVICE

SOUND ATTENUATORS LIMITED
4153815 - ACTIVE ATTENUATION OF RECURRING SOUNDS

SOUND SCIENCES INC.
3894186 - TONE ANALYSIS SYSTEM WITH VISUAL DISPLAY

SOUTHERN PACIFIC COMPANY
3470325 - VIDEO SIGNAL ENCODING TECHNIQUE FOR REDUCED BANDWIDTH TRANSMISSION
3474191 - FACSIMILE BANDWIDTH REDUCING SYSTEM

SOUTHERN PACIFIC TRANSPORTATION COMPANY
3538246 - BANDWIDTH REDUCTION TECHNIQUE FOR ANALOG SIGNAL

SPECTRAL DYNAMICS CORPORATION
3621388 - ELECTRONIC WAVE ANALYZER FOR DETERMINING THE FREQUENCY AND AMPLITUDE OF COMPONENTS IN A COMPLEX WAVEFORM

SPEECH TECHNOLOGY CORPORATION
3870818 - SOLID STATE DIGITAL AUTOMATIC VOICE RESPONSE SYSTEM
4296279 - SPEECH SYNTHESIZER

STANDARD TELEPHONES AND CABLES PTY., LIMITED
3530243 - APPARATUS FOR ANALYZING COMPLEX SIGNAL WAVEFORMS
3573612 - APPARATUS FOR ANALYZING COMPLEX WAVEFORMS CONTAINING PITCH SYNCHRONOUS INFORMATION

STANFORD RESEARCH INSTITUTE
3737580 - SPEAKER AUTHENTICATION UTILIZING A PLURALITY OF WORDS AS A SPEECH SAMPLE INPUT

STORAGE TECHNOLOGY CORPORATION
4314100 - DATA DETECTION CIRCUIT FOR A TASI SYSTEM

STROMBERG-CARLSON CORPORATION
3445606 - MULTI-FREQUENCY DETECTION SYSTEM INCLUDING A FREQUENCY MULTIPLYING CIRCUIT

TEACHING COMPLEMENTS, INCORPORATED
3663758 - SPEECH PATTERN RECOGNITION SYSTEM

TECHNITREND, INC.
3694811 - QUERY AND RESPONSE SYSTEM WITH AUDIO MESSAGE SYNTHESIZING

TELECOMMUNICATIONS RADIOELECTRIQUES ET TELEPHONIQUES T.R.T.
3876833 - RECEIVER FOR SYNCHRONOUS DATA SIGNALS, INCLUDING A DETECTOR FOR DETECTING TRANSMISSION SPEED CHANGES
3952164 - VOCODER SYSTEM USING DELTA MODULATION

TELEDYNE INDUSTRIES, INC.
3454876 - SPECTRAL ANALYSIS OF EVENTS OF FINITE RECORD LENGTH

TELEFONAKTIEBOLAGET LM ERICSSON
3637942 - CONSTANT QUANTIZING SCALE METHOD OF TRANSMITTING A SIGNAL

TELEFUNKEN PATENTVERWERTUNGSGESELLSCHAFT MBH
3445594 - CIRCUIT ARRANGEMENT FOR RECOGNIZING SPOKEN NUMBERS

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

TELETTRA-LABORATORI OI TELEFONIA ELETTRONICA E RAOIO S.P.A.
4005274 - PULSE-COOE MODULATION COMMUNICATION SYSTEM
4057690 - METHOD AND APPARATUS FOR OETECTING THE PRESENCE OF A SPEECH SIGNAL ON A VOICE CHANNEL SIGNAL

TEL-TECH CORPORATION
3636524 - MULTIPLEX COMMUNICATION SYSTEM

TETRACHORO CORPORATION
3760108 - SPEECH OIAGNOSTIC AND THERAPEUTIC APPARATUS INCLUDING MEANS FOR MEASURING THE SPEECH INTENSITY AND FUNDAMENTAL FREQUENCY

TEXACO INC.
3725857 - MEANS AND METHOO FOR TIME-SHARING MULTICHANNEL WELL LOGGING

TEXAS INSTRUMENTS, INCORPORATED
3673331 - IDENTITY VERIFICATION BY VOICE SIGNALS IN THE FREQUENCY OOMAIN
4076960 - CCD SPEECH PROCESSOR
4189779 - PARAMETER INTERPOLATOR FOR SPEECH SYNTHESIS CIRCUIT
4209836 - SPEECH SYNTHESIS INTEGRATEO CIRCUIT DEVICE
4209844 - LATTICE FILTER FOR WAVEFORM OR SPEECH SYNTHESIS CIRCUITS USING OIGITAL LOGIC
4234761 - METHOO OF COMMUNICATING OIGITAL SPEECH OATA AND A MEMORY FOR STORING SUCH OATA
4304964 - VARIABLE FRAME LENGTH OATA CONVERTER FOR A SPEECH SYNTHESIS CIRCUIT
4304965 - OATA CONVERTER FOR A SPEECH SYNTHESIZER
4310831 - PULSE WIOTH MOOULATED, PUSH/PULL OIGITAL TO ANALOG CONVERTER
4319083 - INTEGRATED SPEECH SYNTHESIS CIRCUIT WITH INTERNAL ANO EXTERNAL EXCITATION CAPABILITIES
4323732 - SPEECH SYNTHESIS SYSTEM WITH ALTERNATIVE CODEO OR UNCODED PARAMETER FORMATS
4328395 - SPEECH SYNTHESIS SYSTEM WITH VARIABLE INTERPOLATION CAPABILITY
4331836 - SPEECH SYNTHESIS INTEGRATED CIRCUIT OEVICE
4335275 - SYNCHRONOUS METHOO AND APPARATUS FOR SPEECH SYNTHESIS CIRCUIT
4335277 - CONTROL INTERFACE SYSTEM FOR USE WITH A MEMORY OEVICE EXECUTING VARIABLE LENGTH INSTRUCTIONS
4337375 - MANUALLY CONTROLLABLE OATA REAOING APPARATUS FOR SPEECH SYNTHESIZERS

TEXTRON INC.
3936605 - EYEGLASS MOUNTEO VISUAL DISPLAY

THOMSON-CSF
3639695 - SYSTEMS FOR PROCESSING FREQUENCY MOOULATEO SIGNALS
3761821 - SYSTEMS FOR PROCESSING AND GENERATING FREQUENCY MOOULATEO SIGNALS
3830977 - SPEECH-SYSTHESISER
3869575 - SPEECH-SYNTHESIS SYSTEM
4020292 - BAND-COMPRESSOR OEVICE
4053840 - BANO COMPRESSION OEVICE
4092598 - STATIONS FOR RAOIOELECTRIC TRANSMISSION
4158749 - ARRANGEMENT FOR OISCRIMINATING SPEECH SIGNALS FROM NOISE

THRESHOLO TECHNOLOGY INC.
3821472 - COUGH MONITORING APPARATUS
3883850 - PROGRAMMABLE WORO RECOGNITION APPARATUS
3943295 - APPARATUS ANO METHOD FOR RECOGNIZING WORDS FROM AMONG CONTINUOUS SPEECH
4032710 - WORD BOUNDARY OETECTOR FOR SPEECH RECOGNITION EQUIPMENT
4063031 - SYSTEM FOR CHANNEL SWITCHING BASED ON SPEECH WORO VERSUS NOISE OETECTION
4069393 - WORD RECOGNITION APPARATUS ANO METHOD
4107460 - APPARATUS FOR RECOGNIZING WORDS FROM AMONG CONTINUOUS SPEECH
4319085 - SPEECH RECOGNITION APPARATUS AND METHOO
4336421 - APPARATUS AND METHOD FOR RECOGNIZING SPOKEN WORDS

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

TIME AND SPACE PROCESSING, INC.
4230906 - SPEECH DIGITIZER

TIME/DATA CORPORATION
4045616 - VOCODER SYSTEM

TOKYO SHIBAURA ELECTRIC CO., LTD.
3667047 - SPEECH ARTICULATION FREQUENCY MODULATION COMMUNICATION SYSTEM
3668294 - ELECTRONIC SYNTHESIS OF SOUNDS EMPLOYING FUNDAMENTAL AND FORMANT SIGNAL GENERATING MEANS

TOYOTA JIDOSHA KOGYO KABUSHIKI KAISHA
3422349 - METHOD AND DEVICE FOR DIGITAL, MULTI-FACTOR WAVEFORM ANALYSIS OF VARIABLE STRESS

TRIANGLE RESEARCH, INC.
3536854 - APPARATUS FOR AUDIBLY REPRODUCING PRINTED INDICIA

TRW INC.
3973081 - FEEDBACK RESIDUE COMPRESSION FOR DIGITAL SPEECH SYSTEMS

UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND, -
3555423 - MODULATION CONTROL CIRCUITS FOR DELTA-MODULATION TELECOMMUNICATION SYSTEMS

UNITED STATES OF AMERICA, AIR FORCE
3715509 - METHOD AND MEANS FOR PROVIDING RESOLUTION LEVEL SELECTION IN A SPECTRUM ANALYZER
3891929 - ACOUSTIC SURFACE WAVE FREQUENCY SYNTHESIZER
4081749 - RE-ENTRY TELEMETRY SYSTEM

UNITED STATES OF AMERICA, ARMY
3524930 - RESONANCE SYNTHESIZER FOR SPEECH RESEARCH
3555203 - METHOD OF AND APPARATUS FOR TIME ADJUSTMENT OF INFORMATION
3706048 - INDIRECT FREQUENCY MULTIPLICATION SYSTEM
3860760 - ELECTRONIC TIME COMPRESSOR OR EXPANDER
3876941 - MATCHED FILTER COMMUNICATION SYSTEMS
3936749 - MATCHED FILTER COMMUNICATION SYSTEMS
3947638 - PITCH ANALYZER USING LOG-TAPPED DELAY LINE
3997913 - ELECTRONIC TIME COMPRESSOR/EXPANDER UTILIZING MAGNETIC STORAGE
4004096 - PROCESS FOR EXTRACTING PITCH INFORMATION
4053712 - ADAPTIVE DIGITAL CODER AND DECODER
4070709 - PIECEWISE LINEAR PREDICTIVE CODING SYSTEM
4223180 - HUMAN SPEECH ENVELOPE TRACKER
4310721 - HALF DUPLEX INTEGRAL VOCODER MODEM SYSTEM

UNITED STATES OF AMERICA, NATIONAL AERONAUTICS AND SPACE ADM
3598921 - METHOD AND APPARATUS FOR DATA COMPRESSION BY A DECREASING SLOPE THRESHOLD TEST
3694581 - DIGITAL SLOP THRESHOLD DATA COMPRESSOR
3732405 - APPARATUS FOR STATISTICAL TIME-SERIES ANALYSIS OF ELECTRICAL SIGNALS
4039754 - SPEECH ANALYZER

UNITED STATES OF AMERICA, NAVY
3535643 - DUAL SIMULTANEOUS PULSE COMPRESSION WITH A SINGLE DISPERSIVE DELAY LINE
3568075 - FEATURE ABSTRACTOR
3582957 - FREQUENCY ANALYZER
3588356 - VOCAL PULSE DETECTOR
3600515 - APPARATUS FOR RECONSTRUCTING SPEECH GENERATED IN AN ABNORMAL GAS ATMOSPHERE
3755627 - PROGRAMMABLE FEATURE EXTRACTOR AND SPEECH RECOGNIZER
3828134 - DEVICE FOR CHANGING PITCH OF AN AUDIO SIGNAL TO IMPROVE INTELLIGIBILITY

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

UNITED STATES OF AMERICA, NAVY (CONTINUED)
- 3836714 - OIGITAL VOICE DETECTOR
- 3863026 - HELIUM SPEECH DECOOER
- 3875336 - PERIOOIC SIGNAL OETECTOR
- 3903366 - APPLICATION OF SIMULTANEOUS VOICE/UNVOICE EXCITATION IN A CHANNEL VOCODER
- 3924069 - HELIUM SPEECH OECOOER
- 3950617 - HELIUM SPEECH UNSCRAMBLER WITH PITCH SYNCHRONIZATION
- 3962639 - SYSTEM FOR REOUCING RADIO COMMUNICATION FREQUENCY BANDWIOTH AND INCREASING NUMBER OF CHANNELS AVAILABLE
- 4005423 - SYNTHETIC APERTURE RAOAR UTILIZING A LOW-SPEEO ANALOG-TO-OIGITAL CONVERTER
- 4173003 - OELTIC (TIME COMPRESSOR) WITH ADJUSTABLE MULTIPLICATION RATIO
- 4236043 - FREQUENCY COMPRESSION ANO EXPANSION USING AN ELECTROOPTICAL PROCESSOR
- 4270025 - SAMPLEO SPEECH COMPRESSION SYSTEM
- 4330689 - MULTIRATE DIGITAL VOICE COMMUNICATION PROCESSOR

UNITED TECHNOLOGIES CORPORATION
- 3784737 - HYBRID OATA COMPRESSION

UNIVERSITY OF ILLINOIS FOUNDATION
- 4206320 - HIGH SPEED MOOEM SUITABLE FOR OPERATING WITH A SWITCHEO NETWORK

UNIVERSITY OF VIRGINIA
- 4335276 - APPARATUS FOR NON-INVASIVE MEASUREMENT ANO OISPLAY NASALIZATION IN HUMAN SPEECH

U.S. PHILIPS CORPORATION
- 3559068 - COMPRESSION-EXPANSION INFORMATION TRANSMISSION SYSTEM USING AN FM COMPRESSION PILOT SIGNAL
- 3602818 - OELAY LINE AMPLITUDE COMPRESSION TRANSMISSION SYSTEM
- 3676596 - PERIOOICITY ANALYSER FOR A QUASI-PERIOOIC SIGNAL INCLUDING A DETECTION CIRCUIT
- 3781463 - COLOUR TELEVISION CIRCUIT
- 3830971 - LINE STANDARD CONVERTER FOR CONVERTING A TELEVISION SIGNAL HAVING A NUMBER OF N-LINES PER IMAGE INTO A TELEVISION SIGNAL HAVING A NUMBER OF M-LINES PER IMAGE
- 3855424 - INFORMATION PROCESSOR FOR CHANGING TEMPO OF PLAYBACK FROM THE RECOROEO TEMPO
- 4022986 - PLAYBACK UNIT FOR A LONG-PLAYING RECORD OF A TIME DIVISION MULTIPLEXED AUDIO SIGNAL
- 4034160 - SYSTEM FOR THE TRANSMISSION OF SPEECH SIGNALS
- 4047108 - DIGITAL TRANSMISSION SYSTEM FOR TRANSMITTING SPEECH SIGNALS AT A LOW BIT RATE, AND TRANSMISSION FOR USE IN SUCH A SYSTEM
- 4071716 - OICTATION SYSTEM
- 4084245 - ARRANGEMENT FOR STATISTICAL SIGNAL ANALYSIS
- 4086431 - COMPRESSION SYSTEM
- 4292471 - METHOD OF VERIFYING A SPEAKER

VALCOMETRIX CORPORATION
- 3742451 - CREOIT SALES SYSTEM

VBC, INC.
- 4255620 - METHOO AND APPARATUS FOR BANDWIOTH REOUCTION
- 4314104 - NARROW BAND VOICE MOOULATOR SYSTEM

VEB ELEKTRONISCHE RECHENMASCHINEN
- 3652801 - CIRCUIT ARRANGEMENT FOR SYNTHESIS OF ACOUSTIC ELEMENTS

VICTOR COMPANY OF JAPAN, LIMITED
- 3567849 - VARIABLE BANDWIDTH MAGNETIC RECORDING SYSTEM
- 3975763 - SIGNAL TIME COMPRESSION OR EXPANSION SYSTEM
- 4020291 - SYSTEM FOR TIME COMPRESSION AND EXPANSION OF AUDIO SIGNALS

VINTEN, W., LIMITED
- 3828252 - METER WITH AUDIBLE READ-OUT

ORGANIZATIONAL PATENTING (1/69- 6/82) - - ALPHA LISTING

V-M CORPORATION
3553080 - CIRCUITRY FOR RECORDING AND REPRODUCING VIDEO SIGNAL INFORMATION AS MULTIPLE LIMITED BANDWIDTH SIGNALS

WESTERN COMPANY OF NORTH AMERICA
3925749 - ASYNTHRONOUS PULSE TELEMETRY SYSTEM AND METHOD

WESTINGHOUSE ELECTRIC CORP.
3584158 - HELIUM SPEECH UNSCRAMBLER
3634625 - SPEECH UNSCRAMBLER
3769468 - AUDIO REPRODUCTION METHODS AND APPARATUS
3789137 - TIME COMPRESSION OF AUDIO SIGNALS
3815124 - ANALOG TO DIGITAL CONVERTER
3872503 - ELIMINATION OF TRANSIENTS IN PROCESSING SEGMENTS OF AUDIO INFORMATION
3875344 - DIGITAL DATA COMPRESSION METHOD AND SYSTEM
3989896 - METHOD AND APPARATUS FOR SPEECH IDENTIFICATION

WESTON INSTRUMENTS INC.
3439269 - MULTICHANNEL ANALOG ANALYZER
3969705 - SPECTRUM ANALYZER HAVING MEANS FOR TRANSIENT SIGNAL ANALYSIS

WHITTAKER CORPORATION
3947827 - DIGITAL STORAGE SYSTEM FOR HIGH FREQUENCY SIGNALS

WILLIAMS ELECTRONICS, INC.
4272649 - PROCESSOR CONTROLLED SOUND SYNTHESIZER

XEROX CORPORATION
3472953 - GRAPHIC COMMUNICATION SYSTEM FOR TRANSMITTING REDUCED REDUNDANCY SIGNALS AT THE MAXIMUM RATE OF THE COMMUNICATION LINK
3502815 - TONE SIGNALLING BANDWIDTH COMPRESSION SYSTEM
3714377 - STORE AND FORWARD SPEED CHANGER FOR OFF-LINE TRANSMISSION OF BINARY DATA
3795765 - ALTERNATE ANALOG ENCODING METHOD AND APPARATUS
3806639 - GUARD CIRCUIT AND DWELL TIME LIMITING METHOD FOR THREE LEVEL ANALOG ENCODERS
3876944 - DIBINARY ENCODING TECHNIQUE
4109104 - VOCAL TIMING INDICATOR DEVICE FOR USE IN VOICE RECOGNITION

NISSAN MOTOR COMPANY, LTD.
4311876 - ROUTE GUIDANCE SYSTEM FOR ROADWAY VEHICLES

RADIONICS INC.
4327251 - AUTOMATIC TELEPHONE DIRECTORY MESSAGE SYSTEM

INVENTORS OF INDIVIDUALLY OWNED PATENTS (1/75- 6/82) (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
AHAMED	SYED	V.	743 DAVIS RD.	GILLETTE	NJ	07933
4316061 - MINIMAL DELAY RATE-CHANGE CIRCUITS						
ANDERSON	JAMES	C.	1 MOHEGAN RD.	ACTON	MA	01720
4271332 - SPEECH SIGNAL A/D CONVERTER USING AN INSTANTANEOUSLY-VARIABLE BANDWIDTH FILTER						
BEST	ROBERT	M.	16016 9TH N.E.	SEATTLE	WA	98155
4305131 - DIALOG BETWEEN TV MOVIES AND HUMAN VIEWERS						
BEST	ROBERT	M.	16016 9TH NE.	SEATTLE	WA	98155
4333152 - TV MOVIES THAT TALK BACK						
BODE	HARALD	E.	1344 ABINGTON PL.	NORTH TONAWANDA	NY	14120
4158751 - ANALOG SPEECH ENCODER AND DECODER						
BROWN	CECIL	JR.	P.O. BOX 1	FRIENDSWOOD	TX	77546
3908288 - TEACHING DEVICE						
BRYANT	ROBERT	L.	BOX 6	DRY FORK	VA	24549
3969972 - MUSIC ACTIVATED CHROMATIC ROULETTE GENERATOR						
COULTER	DAVID	C.	9613 PEMBROKE PL.	VIENNA	VA	22180
3872250 - METHOD AND SYSTEM FOR SPEECH COMPRESSION						
DREYFUS	JEAN	ALBERT	5 AVENUE DE LA GRENADE	GENEVA		CH
3946157 - SPEECH RECOGNITION DEVICE FOR CONTROLLING A MACHINE						
EKELAND	THOMAS	C.	45 JOHN ST.	NEW YORK	NY	10038
3953846 - ENCODING DEVICE						
FINCH	ROBERT	A.		PALOS PARK	IL	
4079653 - METHOD AND APPARATUS FOR IMITATING SPEECH CHARACTERISTICS OF VOX HUMANA AND SIMILAR REED ORGAN PIPES						
FJA LLBRANT	TORE		HO KASVA GEN. PL 67	430 80 HOVAS		SE
4271500 - DEVICE FOR CONVERTING A NON-UNIFORMLY SAMPLED SIGNAL WITH SHORT-TIME SPECTRUM TO A UNIFORMLY SAMPLED SIGNAL						
FLETCHER	JAMES	C.		CUPERTINO	CA	
3978287 - REAL TIME ANALYSIS OF VOICED SOUNDS						
FUNAKUBO	HIROYASU			TOKYO		JP
4178472 - VOICED INSTRUCTION IDENTIFICATION SYSTEM						
GAGNON	RICHARD	T.	307 WADSWORTH	BIRMINGHAM	MI	48010
3908085 - VOICE SYNTHESIZER						
GERLACH	RICHARD	K.		ROLLING HILLS ESTATE	CA	
4117265 - HYPEROPTIC TRANSLATOR SYSTEM						
GILLOIRE	ANDRE		7, RUE YANN PERON	22300 LANNION		FR
4319082 - ADAPTIVE PREDICTION DIFFERENTIAL-PCM TRANSMISSION METHOD AND CIRCUIT USING FILTERING BY SUB-BANDS AND SPECTRAL ANALYSIS						
GRAUPE	DANIEL		2821 REDWING	FORT COLLINS	CO	80521
4185168 - METHOD AND MEANS FOR ADAPTIVELY FILTERING NEAR-STATIONARY NOISE FROM AN INFORMATION BEARING SIGNAL						

INVENTORS OF INOIVIOUALLY OWNEO PATENTS (1/75- 6/82) (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
GRIGGS	OAVIO	THURSTON	5128 S. ROLLING RO.	BALTIMORE	MO	21227
3869576 - MECHANICAL STENOGRAPHIC APPARATUS FOR TRANSCRIBING GROUP PROCEEOINGS						
HABAL	MUTAZ	B.	3848 KNOLLTON RO.	INOIANAPOLIS	IN	46208
3906936 - NASAL AIR FLOW OETECTION METHOO FOR SPEECH EVALUATION						
HILLSMAN	DEANE		870 EL CHORRO WAY	SACRAMENTO	CA	95825
3991304 - RESPIRATORY BIOFEEDBACK ANO PERFORMANCE EVALUATION SYSTEM						
HIRATA	YOSHIMUTSU		NO. 10-307	842, ARAI, HINO, TOK		JP
4099030 - SPEECH SIGNAL PROCESSOR USING COMB FILTER						
HONG	JUNG	P.		CUPERTINO	CA	
3978287 - REAL TIME ANALYSIS OF VOICEO SOUNOS						
HYATT	GILBERT	PETER	P.O. BOX 4584	ANAHEIM	CA	92803
4016540 - APPARATUS ANO METHOO FOR PROVIOING INTERACTIVE AUOIO COMMUNICATION						
4060848 - ELECTRONIC CALCULATOR SYSTEM HAVING AUOIO MESSAGES FOR OPERATOR INTERACTION						
KAHN	LEONARO	R.	137 E. 36 ST.	NEW YORK	NY	10016
4131765 - METHOO ANO MEANS FOR IMPROVING THE SPECTRUM UTILIZATION OF COMMUNICATIONS CHANNELS						
KAHN	LEONARO	R.	137 E. 36TH ST.	NEW YORK	NY	10016
4311877 - METHOO ANO MEANS FOR IMPROVING THE RELIABILITY OF SYSTEMS THAT TRANSMIT RELATIVELY WIOEBANO SIGNALS OVER TWO OR MORE REL ATIVELY NA						
KALFAIAN	MEGUER	V.	962 HYPERION AVE.	LOS ANGELES	CA	90029
3864518 - SIGNAL CONVERSION APPARATUS						
3870817 - PHONETIC SOUNO RECOGNIZER FOR ALL VOICES						
3919481 - PHONETIC SOUNO RECOGNIZER						
KEISER	BERNHARO	E.	2046 CARRHILL ROAO	VIENNA	VA	22180
3959597 - OELAY LINE TIME COMPRESSOR ANO EXPANOER						
KOLMOGOROV	ALEXANOR	BORISOVIC	ULITSA ZORGE 237, KV. 36	NOVOSIBIRSK		SU
4109103 - SPEECH SIMULATOR						
LINOENBERG	KLAUS	WILHELM	929 OSCEOLA AVE.	WINTER PARK	FL	32789
3940565 - TIME OOMAIN SPEECH RECOGNITION SYSTEM						
LUCIANO	OAVIO	P.	ONE RENWICK PL.	ITHACA	NY	14850
4105992 - ANIMAL ATTRACTION METHOO ANO APPARATUS						
MANOEL	JEROME		15601 WHITEOAK LA.	HUNTINGTON BEACH	CA	92647
4174517 - CENTRAL SYSTEM FOR CONTROLLING REMOTE OEVICES OVER POWER LINES						
MARLEY	JOHN		8715 E. MACKENZIE OR.	SCOTTSOALE	AZ	85251
4181813 - SYSTEM ANO METHOO FOR SPEECH RECOGNITION						
4284846 - SYSTEM ANO METHOO FOR SOUNO RECOGNITION						
MARTIN	JOHN	R.	2345 W. MILL RO.	MILWAUKEE	WI	53209
4335379 - METHOO ANO SYSTEM FOR PROVIOING AN AUOIBLE ALARM RESPONSIVE TO SENSEO CONOITIONS						

INVENTORS OF INDIVIDUALLY OWNED PATENTS (1/75- 6/82) (ALPHA LISTING)

INVENTOR NAME			STREET	CITY	ST	ZIP/CNTRY
MATHEWSON	CLIFFORD	EARL	18624 VINTAGE	NORTHRIDGE	CA	91324
4035783 - ANALOG DELAY CIRCUIT						
MILLER	HERMAN	P. III	P.O. BOX 2163	STOCKTON	CA	95201
4315105 - NARROW BAND TRANSMISSION SYSTEM AND METHOD						
MOLL	EDWARD	W.	32 WOODSTREAM DR.	NORRISTOWN	PA	19403
4280192 - MINIMUM SPACE DIGITAL STORAGE OF ANALOG INFORMATION						
MOZER	FORREST	S.	38 SOMERSET PL.	BERKELEY	CA	94707
4214125 - METHOD AND APPARATUS FOR SPEECH SYNTHESIZING						
4314105 - DELTA MODULATION METHOD AND SYSTEM FOR SIGNAL COMPRESSION						
SOUMAGNE	JOE	L	2560 RUE TROYES	SHERBROOKE, QUEBEC		CA
4331837 - SPEECH/SILENCE DISCRIMINATOR FOR SPEECH INTERPOLATION						
STRANDBERG	TERRY	W.	614 PARK RD.	REDWOOD CITY	CA	94062
4189625 - METHOD AND APPARATUS FOR PROCESSING DUAL FREQUENCY DIGITAL INFORMATION SIGNALS						
SUTTON	JOHN	F.	4412 GREENWOOD ROAD	BELTSVILLE	MD	20705
3949174 - SYNCHRONIZED FREQUENCY TRANSPOSER						
WATERBURY	NELSON	J.	400 COCONUT ROW	PALM BEACH	FL	33480
3896266 - CREDIT AND OTHER SECURITY CARDS AND CARD UTILIZATION SYSTEMS THEREFORE						
WEBSTER	RONALD	L.	P.O. BOX 9737	HOLLINS COLLEGE	VA	24020
4020567 - METHOD AND STUTTERING THERAPY APPARATUS						
WILLIAMSON	JOHN	D.	P.O. BOX 763	THEODORE	AL	36582
4142067 - SPEECH ANALYZER FOR ANALYZING FREQUENCY PERTURBATIONS IN A SPEECH PATTERN TO DETERMINE THE EMOTIONAL STATE OF A PERSON						
WILLIAMSON	JOHN	DECATUR	BOX 763	THEODORE	AL	36582
4093821 - SPEECH ANALYZER FOR ANALYZING PITCH OR FREQUENCY PERTURBATIONS IN INDIVIDUAL SPEECH PATTERN TO DETERMINE THE EMOTIONAL S TATE OF TH						
ZAGORUIKO	NIKOLAI	GRIGORIEV	MORSKOI PROSPEKT 21, KV. 28	NOVOSIBIRSK		SU
4109103 - SPEECH SIMULATOR						
ZENZEFILIS	GEORGE	E.	27 LOS VIENTOS	CAMARILLO	CA	93010
3974329 - TRANSMISSION OF VIDEO PICTURES AT AUDIO FREQUENCIES						
ZURCHER	JEAN		10, RUE DU DAUPHINE	22300 LANNION		FR
4319082 - ADAPTIVE PREDICTION DIFFERENTIAL-PCM TRANSMISSION METHOD AND CIRCUIT USING FILTERING BY SUB-BANDS AND SPECTRAL ANALYSIS						
ZURCHER	JEAN-FREDERIC		34, RESIDENCE CORLAY	LANNION		FR
4063030 - DETECTION CIRCUIT FOR SIGNIFICANT PEAKS OF SPEECH SIGNALS						
ZURCHER	JEAN-FREDERIC		10, RUE DU DAUPHINE	22300 LANNION		FR
4079197 - VOICE TRANSCODER IN HELIUM ATMOSPHERE						

PATENTS (1/63- 6/82) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN THE DATA BASE

3431359 - AMPLITUDE EQUALIZER OF SPEECH SOUND WAVES WITH HIGH FIDELITY

PATENTS (1/63- 6/82) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN THE DATA BASE

3432617 - SPEECH SOUND WAVE ANALYSIS
3433232 - PROCESS FOR APPLYING DESIGNS TO THE SURFACE OF THE HAIR
3440349 - NOISE LEVEL VISUAL INDICATOR
3463885 - SPEECH AND SOUND DISPLAY SYSTEM
3485951 - SPEECH RECOGNIZING CIRCUIT
3510597 - FREQUENCY BANDWIDTH COMPRESSION AND EXPANSION SYSTEM
3525811 - REMOTE CONTROL VOTING SYSTEM
3585303 - TELEPHONE COMMUNICATION SYSTEM FOR THE DEAF
3591735 - ANALOG VOICE PROCESSING FOR A TRANSMISSION SYSTEM
3604852 - APPARATUS FOR THE VISUAL AESTHETIC DISPLAY OF SOUND
3622704 - VOCODER SPEECH TRANSMISSION SYSTEM
3622706 - PHONETIC SOUND RECOGNITION APPARATUS FOR ALL VOICES
3624306 - METHOD AND SYSTEM FOR COMPRESSING BANDWIDTH
3627912 - VISUAL DISPLAY OF COMPLEX COLOR TELEVISION SOUND WAVE SIGNALS
3646576 - SPEECH CONTROLLED PHONETIC TYPEWRITER
3659051 - COMPLEX WAVE ANALYZING SYSTEM
3670107 - WORD AND LETTER SPACING ARRANGEMENT FOR HUMAN-SPEECH TYPEWRITERS
3674939 - BASEBAND PULSE CODE MODULATION SYSTEM
3678201 - BANDWIDTH COMPRESSION SYSTEM IN PHONETIC SOUND SPECTRUM
3684829 - NON-LINEAR QUANTIZATION REFERENCE AMPLITUDE LEND TIME CROSSING INTERVALS
3689696 - SPEECH SYNTHESIS FROM A SPECTROGRAPHIC TRACE
3743783 - APPARATUS FOR SIMULTANEOUSLY RECORDING SPEECH SPECTRA AND PHYSIOLOGICAL DATA
3743787 - SPEECH SIGNAL TRANSMISSION SYSTEMS UTILIZING A NON-LINEAR CIRCUIT IN THE BASE BAND CHANNEL
3746791 - SPEECH SYNTHESIZER UTILIZING WHITE NOISE
3749837 - ELECTRONIC MUSICAL TONE MODIFIER FOR MUSICAL INSTRUMENTS
3752929 - PROCESS AND APPARATUS FOR DETERMINING THE DEGREE OF NASALITY OF HUMAN SPEECH
3770891 - VOICE IDENTIFICATION SYSTEM WITH NORMALIZATION FOR BOTH THE STORED AND THE INPUT VOICE SIGNALS
3777071 - SOUND SEQUENCE INTERVAL CHANGING STRUCTURE
3781479 - METHOD AND APPARATUS FOR TRANSMITTING TIME COMPRESSED AUDIO INFORMATION
3784754 - APPARATUS AND METHOD FOR TRANSMITTING AND RECEIVING SIGNALS BASED UPON HALF CYCLES
3789143 - COMPANDER WITH CONTROL SIGNAL LOGARITHMICALLY RELATED TO THE INSTANTANEOUS RMS VALUE OF THE INPUT SIGNAL
3798372 - APPARATUS AND METHOD FOR RETARDATION OF RECORDED SPEECH
3800093 - METHOD OF DESIGNING ORTHOGONAL FILTERS
3801747 - SPEECH DETECTOR FOR PCM-TASI SYSTEM
3803363 - APPARATUS FOR THE MODIFICATION OF THE TIME DURATION OF WAVEFORMS
3808371 - REAL-TIME MECHANICAL DETECTION OF DIPHTHONGS FOR SPEECH CONTROLLED PHONETIC TYPEWRITER
3810156 - SIGNAL IDENTIFICATION SYSTEM
3816664 - SIGNAL COMPRESSION AND EXPANSION APPARATUS WITH MEANS FOR PRESERVING OR VARYING PITCH
3818147 - PORTABLE VOICE MESSAGE GENERATOR
3833767 - SPEECH COMPRESSION SYSTEM
3846586 - SINGLE ORAL INPUT REAL TIME ANALYZER WITH WRITTEN PRINT-OUT
3852535 - PITCH DETECTION PROCESSOR
3855416 - METHOD AND APPARATUS FOR PHONATION ANALYSIS LEADING TO VALID TRUTH/LIE DECISIONS BY FUNDAMENTAL SPEECH-ENERGY WEIGHTED V IBRATTO CO
3855417 - METHOD AND APPARATUS FOR PHONATION ANALYSIS LEADING TO VALID TRUTH/LIE DECISIONS BY SPECTRAL ENERGY REGION COMPARISON
3855418 - METHOD AND APPARATUS FOR PHONATION ANALYSIS LEADING TO VALID TRUTH/LIE DECISIONS BY VIBRATTO COMPONENT ASSESSMENT
3855425 - DELAY LINE TIME COMPRESSOR AND EXPANDER
3071652 3071727 3076532 3078345 3079464 3083266 3084327 3086785 3087989 3090837 3091665 3093796

PATENTS (1/63- 6/82) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN THE DATA BASE

3094692	3102165	3102928	3102929	3102938	3104284	3104393	3105950	3106701	3108253	3109058	3109070
3109142	3113187	3114980	3115605	3116374	3123768	3124654	3124745	3124750	3125723	3126449	3127276
3127476	3127477	3129207	3139487	3141069	3142727	3144519	3146309	3147276	3150374	3151296	3154170
3157745	3158685	3158693	3159720	3162808	3163077	3165586	3165741	3167710	3175038	3175154	3176073
3176224	3176225	3180936	3181074	3182256	3183303	3183803	3184542	3184679	3185823	3185824	3185942
3188388	3190960	3190963	3192315	3192321	3196212	3196350	3197560	3200899	3201787	3202761	3204026
3204030	3209074	3209079	3209263	3211833	3213097	3213197	3213268	3214520	3214530	3215773	3215934
3217103	3217231	3217251	3219934	3221710	3225333	3226644	3230311	3233236	3234332	3236947	3238203
3238298	3238303	3238456	3238928	3243507	3243703	3246084	3247332	3262104	3268660	3268661	3268666
3270833	3274341	3275746	3278907	3280266	3281257	3283080	3286032	3286231	3286362	3289078	3294896
3294902	3294918	3295107	3296371	3296374	3299204	3301910	3302898	3303335	3309079	3309263	3310786
3311827	3311832	3319002	3321582	3321710	3321759	3322898	3324237	3324243	3325596	3325597	3325601
3327057	3327058	3327062	3327063	3328525	3330910	3335225	3336578	3337063	3337800	3337847	3339017
3339142	3340364	3341659	3344231	3344233	3344239	3344349	3346694	3346695	3348203	3349180	3349183
3349184	3349898	3350650	3351710	3355551	3355554	3356836	3360610	3360724	3361877	3361916	3364425
3366739	3367045	3369076	3369077	3369182	3370128	3370241	3370243	3370597	3376386	3376387	3377423
3377428	3378641	3379076	3379077	3381091	3381093	3383463	3383466	3387090	3387093	3388330	3391918
3392336	3393336	3394228	3394309	3394909	3394989	3395249	3395345	3395347	3396371	3398241	3398364
3400215	3401392	3402258	3402352	3403227	3404897	3405237	3409743	3409833	3410815	3411153	3412214
3412269	3414677	3414815	3415080	3418429	0	0	0	0	0	0	0

SPEECH ANALYSIS AND SYNTHESIS

Selected Patents

Two major types of speech coding are generally used in speech synthesizers. These are coding in the time domain and coding in the frequency domain.

Commercially available units include coding techniques such as formant synthesis, Linear Predictive Coding (LPC), and straight waveform sampling and digitization. Formant coding is an example of coding in the frequency domain while LPC and waveform sampling are examples of coding in the time domain.

Formants are frequencies at which the major harmonics of the vocal tract occur. Codes representing these harmonics, including center frequency and bandwidth, are stored and later combined in various ways to form phonemes. The phonemes are, in turn, combined to form words and sentences. Natural pauses, word duration and pitch, etc., must also be coded and incorporated into the resultant speech waveform to produce realistic speech.

LPC synthesis is based on the fact that certain voiced speech samples are linearly predictable on the basis of past speech samples. This allows the control parameters used for synthesis to be efficiently encoded. These parameters include the pitch period, a voiced-unvoiced binary signal, the rms value of the speech sample and the predictor coefficients which are applied to past samples. A single digital recursive filter is used as a linear predictor, and a pulse generator simulates the vocal cord pitch periods. The limited number of parameters allows a pronounced reduction in data storage requirements.

In synthesizers using waveform sampling and digitization, the Fourier series of an actual speech wave is coded and stored. Various data compression techniques such as adaptive delta modulation are employed to reduce data storage requirements. The compressed data is then expanded and combined to reproduce the original speech waveform.

The following 10 patents were selected as being of particular interest in the field of speech synthesis. The first two patents are systems which generate speech using formant synthesis. The next two patents are examples of linear predictive coding (LPC) synthesis. The fifth patent is an example of waveform sampling and digitization. The five remaining patents are selected examples of commercially successful applications of speech synthesizers.

* * *

THIS FORMANT SYNTHESIS SYSTEM USES A DIGITALLY CONTROLLED ANALOG DELAY LINE TO SIMULATE THE VOICE TRACT. THE IMPROVEMENT LIES IN THE USE OF PROGRAM CONTROLLED RAM'S WHICH SMOOTH THE TRANSITION FROM PHONEME TO PHONEME BY GRADUALLY CHANGING THE PHONEME PARAMETERS FROM ONE PHONEME LEVEL TO THE NEXT. THIS TECHNIQUE AVOIDS THE ABRUPT TRANSITIONS BETWEEN PHONEMES WHICH ARE A NORMAL ELEMENT OF DIGITAL CONTROL, AND WHICH ARE THE CAUSE OF THE STACCATO, UNNATURAL SOUND OF OTHER DIGITALLY CONTROLLED PHONEME CONCATENATION SPEECH SYNTHESIZERS.

United States Patent [19] [11] **4,264,783**

Gagnon [45] **Apr. 28, 1981**

[54] **DIGITAL SPEECH SYNTHESIZER HAVING AN ANALOG DELAY LINE VOCAL TRACT**

[75] Inventor: **Richard T. Gagnon,** Rochester, Mich.

[73] Assignee: **Federal Screw Works,** Detroit, Mich.

[21] Appl. No.: **952,792**

[22] Filed: **Oct. 19, 1978**

[51] **Int. Cl.**[3] **G10L 1/00**

[52] **U.S. Cl.** ..... **179/1 SD**

[58] **Field of Search** ..... 179/1 SA, 1 SD, 1 SE, 179/1 SC; 333/217; 330/107, 109; 364/724, 825

[56] **References Cited**

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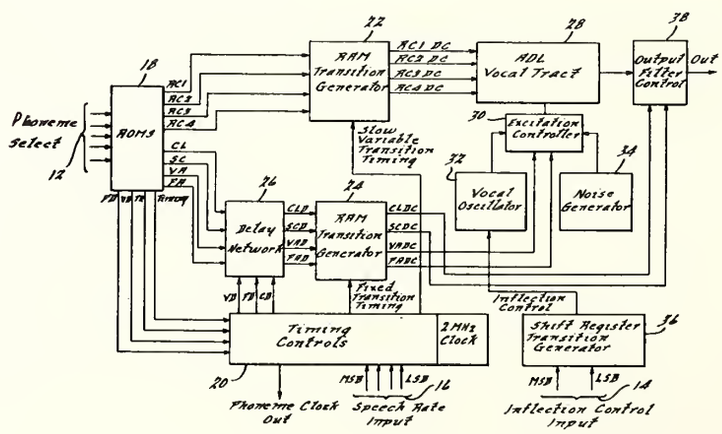
J. L. Flanagan, "Speech Analysis and Synthesis", Springer-Verlag, 1972, pp. 77, 78.

Primary Examiner—Charles E. Atkinson
Assistant Examiner—E. S. Kemeny
Attorney, Agent, or Firm—Harness, Dickey & Pierce

[57] **ABSTRACT**

A phoneme based speed synthesizer that utilizes an analog delay line (ADL) vocal tract which simulates the variations in the acoustical characteristics of the human vocal tract which occur as a result of changes in the cross-sectional area of the human vocal tract at different points along its length. The ADL vocal tract comprises a plurality of T-sections having a resistor as the series component and a frequency dependent negative resistance (FDNR) as the shunt component. Both the series and shunt components are readily tunable via electric control signals, although in the preferred embodiment only the series resistive elements are tuned. Except for the vocal excitation source, the ADL vocal tract is driven entirely by digital circuitry, including novel digital transition circuitry for producing gradual variations in the values of the control signals as they change from phoneme to phoneme.

44 Claims, 10 Drawing Figures



THIS FORMANT SYNTHESIZER IMPROVES THE QUALITY OF GENERATED SPEECH BY USING SEVEN INPUT CONTROL BITS TO DEFINE A SELECTED PHONEME INSTEAD OF THE USUAL SIX BITS. THIS ALLOWS THE SYSTEM TO ALTER BASIC PHONEMES TO PROVIDE FOR THE VARIABILITY OF SPEECH AND TO INCORPORATE PHONEMES WHICH ARE UNIQUE TO CERTAIN FOREIGN LANGUAGES. ALSO INCLUDED ARE TWO DATA BITS TO VARY PHONEME DURATION AND THREE DATA BITS TO VARY VOICE INFLECTION LEVELS. THE PHONEMES THUS PRODUCED ARE PASSED THROUGH THE NORMAL SERIES OF FILTERS AND DYNAMIC CONTROL CIRCUITS WHICH SIMULATE VOCAL TRACT CONTROLS, PRODUCING A MORE NATURAL SOUNDING SPEECH OUTPUT.

United States Patent [19]

Dorais

[11] **4,301,328**

[45] * **Nov. 17, 1981**

[54] **VOICE SYNTHESIZER**

[75] Inventor: **Mark V. Dorais,** Detroit, Mich.

[73] Assignee: **Federal Screw Works,** Detroit, Mich.

[*] Notice: The portion of the term of this patent subsequent to Dec. 5, 1995, has been disclaimed.

[21] Appl. No.: **964,603**

[22] Filed: **Nov. 29, 1978**

Related U.S. Application Data

[63] Continuation of Ser. No. 714,495, Aug. 16, 1976, Pat. No. 4,128,737.

[51] **Int. Cl.**[3] **G10L 1/00**

[52] **U.S. Cl.** ..... **179/1 SA;** 179/1 SM

[58] **Field of Search** ..... 179/1 SA, 1 SF, 1 SM, 179/1 SG

[56] **References Cited**

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House et al., "The Influence of Consonant Environments", J. Ac. Soc. Amer., vol. 25, Jan. 1953.

C. Gunnar, M. Fant "On the Predictability of Formant Levels etc.", from Readings in Acoustic Phonetics (I. Lehiste, ed.), 1956.

Primary Examiner—Mark E. Nusbaum

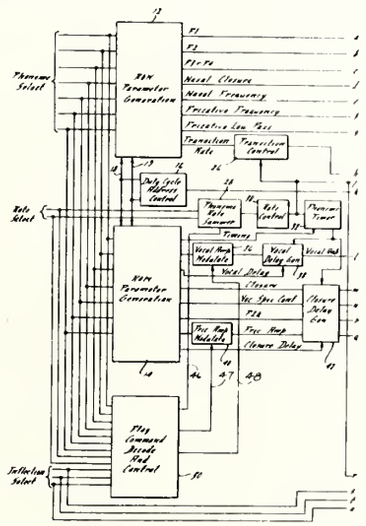
Assistant Examiner—E. S. Kemeny

Attorney, Agent, or Firm—Harness, Dickey & Pierce

[57] **ABSTRACT**

A voice synthesizer that is responsive to sequences of digital input command words to phonetically synthesize human speech. The system includes control circuits that are responsive to the input command words to introduce an articulated silent phoneme into the speech pattern, vary the duration of each phoneme produced, as well as to vary the overall rate and volume of the speech generated. In addition, the design utilizes inflection assignment for individual phonemes and also employs a glottal waveform which is more representative of human glottis action. The invention also incorporates resonant suppression into the vocal tract to simulate the dampening effect due to the opening of the glottis, and provides closer simulation of human energy content at higher frequencies to improve the quality of the speech generated.

4 Claims, 10 Drawing Figures



THIS PATENT IS ONE OF A SERIES OF PATENTS DIRECTED TO TEXAS INSTRUMENTS' "SPEAK AND SPELL" LEARNING AID. THE BREAKTHROUGH WHICH MADE THE COMPACT LEARNING AID POSSIBLE WAS THE PRODUCTION OF A MULTI-STAGE DIGITAL FILTER INTEGRATED CIRCUIT. WITH THE USE OF THIS FILTER CIRCUIT, A LINEAR PREDICTIVE CODING (LPC) SPEECH SYNTHESIZER COULD BE IMPLEMENTED IN INTEGRATED CIRCUIT FORM INSTEAD OF ON THE LARGE MULTI-PURPOSE DIGITAL COMPUTERS WHICH HAD BEEN REQUIRED IN THE PAST. IN THIS PATENT, THE USE OF VARIABLE FRAME LENGTH DATA PERMITS STORAGE OF SOME PARAMETERS IN A REDUCED LENGTH FRAME, THUS CONSERVING STORAGE CAPACITY AND REDUCING THE REQUIRED BIT RATE. THIS TECHNIQUE PERMITS THE STORAGE OF A MUCH LARGER VOCABULARY.

United States Patent [19]

Wiggins, Jr. et al.

[11] **4,234,761**

[45] **Nov. 18, 1980**

[54] **METHOD OF COMMUNICATING DIGITAL SPEECH DATA AND A MEMORY FOR STORING SUCH DATA**

[75] Inventors: **Richard H. Wiggins, Jr.**, Dallas; **George L. Brantingham**, Lubbock, both of Tex.

[73] Assignee: **Texas Instruments Incorporated**, Dallas, Tex.

[21] Appl. No.: **916,989**

[22] Filed: **Jun. 19, 1978**

Related U.S. Application Data

[62] Division of Ser. No. 901,392, Apr. 28, 1978.

[51] **Int. Cl.**[2] **G11C 13/00**; G10L 1/08

[52] **U.S. Cl.** ..... **179/1 SM**; 365/45; 370/7

[58] **Field of Search** ..... 365/45, 63, 73; 179/15 AV, 1 SM, 1 SA

[56] **References Cited**

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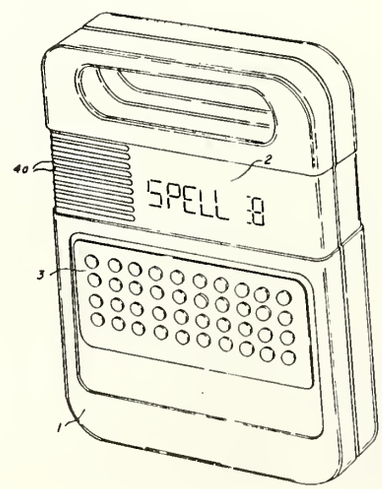
Primary Examiner—Terrell W. Fears
Attorney, Agent, or Firm—Andrew J. Dillon; Stephen S. Sadacca; Mel Sharp

[57] **ABSTRACT**

A method of communicating Digital Speech Data to a speech synthesis circuit. The data is compressed to on the order of 1000–1200 bits, per second for normal human speech. The speech synthesis circuit utilizes linear predictive coding techniques for producing high quality speech or other sounds.

The data is preferably stored in a memory which is coupled to the speech synthesis circuit. The data has variable frame lengths; in the disclosed embodiment, four different frame lengths are described having frame lengths from four bits to forty-nine bits. The memory stores the variable frame length data and communicates the same to the speech synthesis circuit in response to certain control signals.

8 Claims, 55 Drawing Figures



IN THIS LPC CIRCUIT, IMPLEMENTED ON A SINGLE CHIP, DATA IS CONSERVED BY USING A DOUBLE BUFFERING CIRCUIT WITH A REPEAT CAPABILITY TO RECEIVE THE SPEECH DATA, USING THE SAME EXCITATION SIGNAL FOR BOTH VOICED AND FRICATIVE (UNVOICED) SOUNDS, AND USING A TIME MULTIPLEXED DIGITAL FILTER WHICH REQUIRES FEWER BITS PER FILTER COEFFICIENT THAN A CONVENTIONAL DIRECT FILTER. THESE DATA REDUCTION TECHNIQUES ALLOW AN EXPANDED VOCABULARY TO BE STORED WITHOUT A CORRESPONDING INCREASE IN MEMORY STORAGE CAPACITY.

United States Patent [19]

Stork

[11] **4,296,279**

[45] **Oct. 20, 1981**

[54] **SPEECH SYNTHESIZER**

[75] Inventor: **John E. Stork**, Malibu, Calif.

[73] Assignee: **Speech Technology Corporation**, Santa Monica, Calif.

[21] Appl. No.: **117,075**

[22] Filed: **Jan. 31, 1980**

[51] **Int. Cl.**[3] **G10L 1/00**

[52] **U.S. Cl.** ..... **179/1 SM**

[58] **Field of Search** ..... 179/1 SM, 1 SA, 1 D, 179/15.55 R, 15.55 T; 364/724; 333/166

[56] **References Cited**

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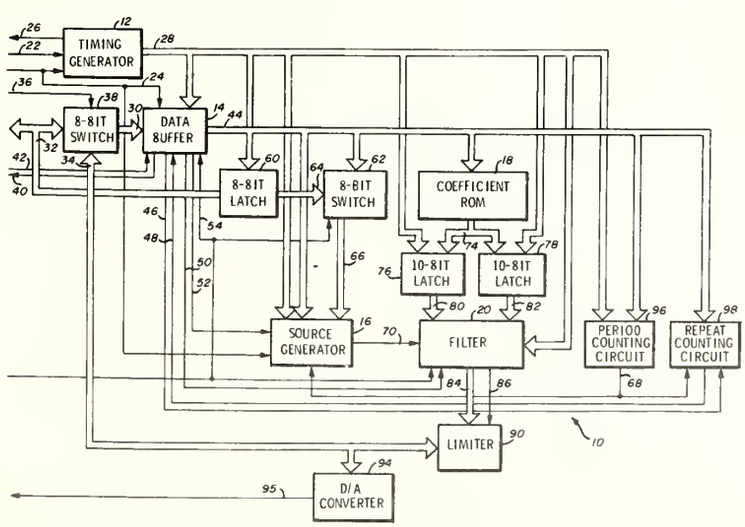
Primary Examiner—Mark E. Nusbaum
Assistant Examiner—E. S. Kemeny
Attorney, Agent, or Firm—Thomas E. Schatzel

[57] **ABSTRACT**

A speech synthesizer for developing a signal representing both voiced and fricative sounds from signals representing blocks of externally generated data, the synthesizer including a period counter for delineating a series of pitch periods each having a duration specified by the data, a source generator for developing an excitation signal having an amplitude specified by the data, the excitation signal being developed at the beginning of each of a series of constant duration sample intervals each with a random sign for fricative sounds, the excitation signal being developed at the beginning of each of the pitch periods for voiced sounds and a time multiplexed digital filter having characteristics specified by the data including circuit switching to control whether the filter functions as a second-order filter or a cascaded pair of first-order filters, the filter being driven by the excitation signal during the beginning of each of the sample intervals and by the output of the filter thereafter so as to develop the speech signal at the filter output.

10 Claims, 15 Drawing Figures



THIS SYNTHESIZER USES WAVEFORM SAMPLING AND DIGITIZATION. IN ADDITION TO THE STANDARD COMPRESSION TECHNIQUE OF ADAPTIVE DELTA MODULATION, THIS SYSTEM, INVENTED, IN PART, BY PROFESSOR FOREST S. MOZER AT THE UNIVERSITY OF CALIFORNIA, USES TWO NEW COMPRESSION TECHNIQUES CALLED X-PERIOD ZEROING AND PHASE ADJUSTING. IN X-PERIOD ZEROING A PORTION OF THE DATA OF EACH PITCH PERIOD, E.G., THE LAST HALF, IS REDUCED TO ZERO WITHOUT SERIOUSLY DEGRADING THE SPEECH. PHASE ADJUSTING TAKES ADVANTAGE OF THE FACT THAT THE PHASE ANGLES OF A SPEECH WAVEFORM, WHEN REPRESENTED AS A FOURIER SERIES, ARE NOT NEEDED TO REPRODUCE INTELLIGIBLE SPEECH. THEREFORE, EACH WAVEFORM CAN BE ADJUSTED IN PHASE TO YIELD A MIRROR SYMMETRICAL WAVE, HALF THE DATA OF WHICH CAN BE DISCARDED AS REDUNDANT. THE USE OF ALL OF THESE COMPRESSION TECHNIQUES YIELDS A BIT RATE COMPARABLE TO LPC.

United States Patent [19]

Mozer et al.

[11] **4,214,125**

[45] **Jul. 22, 1980**

[54] **METHOD AND APPARATUS FOR SPEECH SYNTHESIZING**

[75] Inventors: **Forrest S. Mozer**, 38 Somerset Pl., Berkeley, Calif. 94707; **Richard P. Stauduhar**, Berkeley, Calif.

[73] Assignee: **Forrest S. Mozer**, Berkeley, Calif.

[21] Appl. No.: **761,210**

[22] Filed: **Jan. 21, 1977**

Related U.S. Application Data

[63] Continuation of Ser. No. 632,140, Nov. 14, 1975, abandoned, which is a continuation-in-part of Ser. No. 525,388, Nov. 20, 1974, abandoned, which is a continuation-in-part of Ser. No. 432,859, Jan. 14, 1974, abandoned.

[51] **Int. Cl.**[2] **G10L 1/00**

[52] **U.S. Cl.** ..... **179/1 SM**

[58] **Field of Search** ..... 179/1 SM, 1 SA, 15 A, 179/15 AC, 15 PC, 15.55 T

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,102,165	8/1963	Clapper	179/1 SG
3,165,741	1/1965	Thor	179/15 AC
3,369,077	2/1968	French	179/1 SM
3,416,080	12/1968	Wright et al.	179/1 SD
3,588,353	6/1971	Martin	179/1 SA
3,588,353	6/1971	Martin	179/1.5 SA
3,641,496	2/1972	Slavin	179/1 SM
3,750,024	7/1973	Dunn	179/1 SA
3,789,144	1/1974	Doyle	179/15.55 T
3,811,016	5/1974	Takasaki et al.	179/170 R
3,892,919	7/1975	Ichikawa	179/1 SM
3,942,126	3/1976	Muraoka	179/15 A

OTHER PUBLICATIONS

W. Bucholz, "Computer Controlled Audio Output", IBM Tech. Bull., vol. 3, No. 5, Oct. 1960, p. 60.

J. L. Flanagan, "Speech Analysis, Synthesis and Perception", Springer-Verlag, 1972, pp. 395,396,401-404.

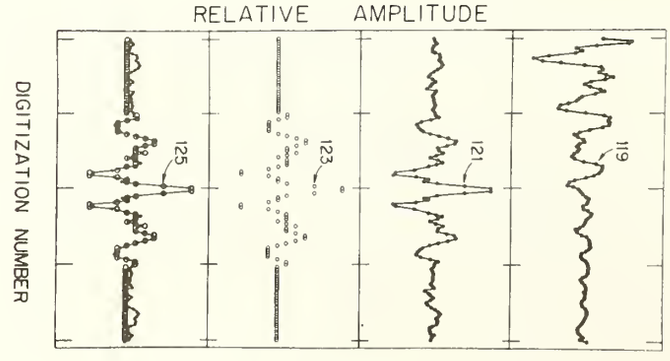
G. Hellwarth, G. Jones, "Automatic Conditioning of Speech Signals," IEEE Trans. on Audio and EA, Jun. 1968 pp. 169-179.

Primary Examiner—Malcolm A. Morrison
Assistant Examiner—E. S. Kemeny
Attorney, Agent, or Firm—Townsend and Townsend

[57] **ABSTRACT**

A method and apparatus for analyzing and synthesizing speech information in which a predetermined vocabulary is spoken into a microphone, the resulting electrical signals are differentiated with respect to time, digitized, and the digitized waveform is appropriately expanded or contracted by linear interpolation so that the pitch periods of all such waveforms have a uniform number of digitizations and the amplitudes are normalized with respect to a reference signal. These "standardized" speech information digital signals are then compressed in the computer by subjectively removing and discarding redundant speech information such as redundant pitch periods, portions of pitch periods, redundant phonemes and portions of phonemes, redundant amplitude information (delta modulation) and phase informaton (Fourier transformation). The compression techniques are selectively applied to certain of the speech information signals by listening to the reproduced, compressed information. The resulting compressed digital information and associated compression instruction signals produced in the computer are thereafter injected into the digital memories of a digital speech synthesizer where they can be selectively retrieved and audibly reproduced to recreate the original vocabulary words and sentences from them.

100 Claims, 29 Drawing Figures



THIS PATENT AND THE FOUR WHICH FOLLOW ARE EXAMPLES OF SUCCESSFUL COMMERCIAL APPLICATIONS OF SPEECH SYNTHESIZERS. THIS INVENTION IS A SYSTEM FOR GIVING VOICED WARNINGS OF ABNORMAL CONDITIONS IN AN AUTOMOBILE.

United States Patent [19]

Barton et al.

[11] **3,870,818**

[45] **Mar. 11, 1975**

[54] **SOLID STATE DIGITAL AUTOMATIC VOICE RESPONSE SYSTEM**

[75] Inventors: **William A. Barton; John E. Stork,** both of Malibu, Calif.

[73] Assignee: **Speech Technology Corporation,** Santa Monica, Calif.

[22] Filed: **Aug. 24, 1973**

[21] Appl. No.: **391,297**

[52] **U.S. Cl.** ..... **179/1 SM,** 340/27 R

[51] **Int. Cl.** **G10l 1/04**

[58] **Field of Search** ..... 179/1 SA, 15.55 R, 1 SM, 179/1 SG; 340/27 R, 152, 148, 22

[56] **References Cited**

UNITED STATES PATENTS

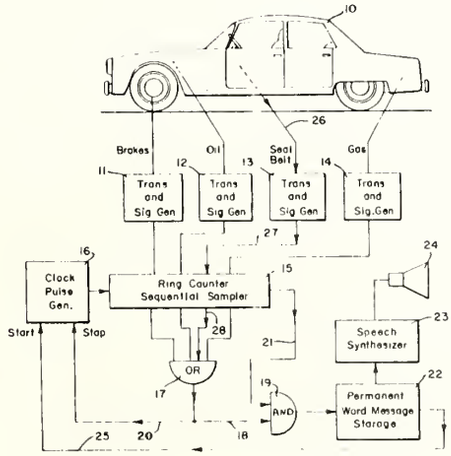
3,158,685	11/1964	Gerstman et al.	179/1 SG
3,581,014	8/1971	Vogel et al.	340/27 R

Primary Examiner—William C. Cooper
Assistant Examiner—Tommy P. Chin

[57] **ABSTRACT**

A voice response device similar to an annuciator includes comprising individual circuits each capable upon triggering of generating speech synthesizing signals corresponding to a given word or phrase. Digital code groups represent the permanently stored words or phrases. A particular code group is generated and applied to the storage unit to reproduce the corresponding message only if a given condition occurs. The voice response system is ideally suited to automobiles wherein a condition such as an unfastened seat belt will automatically generate a digital code group which when applied to the storage unit results in an audible formation of a message such as "fasten seat belt".

2 Claims, 2 Drawing Figures



4,179,584

THIS INVENTION IS A TALKING CALCULATOR. THE VOCABULARY CONSISTS OF THE COMPLETE RANGE OF DECIMAL NUMBERS AND THE ARITHMETIC OPERANDS.

United States Patent [19]

Tanimoto et al.

[11] **4,179,584**

[45] **Dec. 18, 1979**

[54] SYNTHETIC-SPEECH CALCULATORS

[75] Inventors: **Akira Tanimoto**, Kashihara; **Sigeaki Masuzawa**, Nara; **Shinya Shibata**, Nara; **Shinzo Nishizaki**, Nara, all of Japan

[73] Assignee: **Sharp Kabushiki Kaisha**, Osaka, Japan

[21] Appl. No.: **882,267**

[22] Filed: **Feb. 28, 1978**

[30] **Foreign Application Priority Data**

Feb. 28, 1977	[JP]	Japan	52-22083
Mar. 1, 1977	[JP]	Japan	52-22514
Mar. 23, 1977	[JP]	Japan	52-32487

[51] **Int. Cl.**[2] **G10L 1/00**

[52] **U.S. Cl.** ..... **179/1 SM; 364/710**

[58] **Field of Search** ..... 179/1 SM; 364/710, 200, 364/900; 35/35 C

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,908,085	9/1975	Gagnon	179/1 SM
4,060,848	11/1977	Hyatt	179/1 SM

OTHER PUBLICATIONS

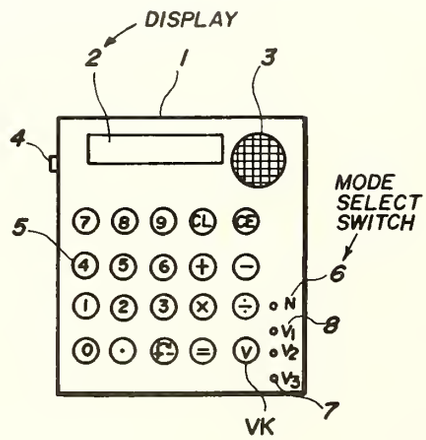
L. Rosenthal et al., "Automatic Voice Response," IEEE Spectrum, Jul. 1974, pp. 61-68.

Primary Examiner—Kathleen H. Claffy
Assistant Examiner—E. S. Kemeny
Attorney, Agent, or Firm—Birch, Stewart, Kolasch and Birch

[57] **ABSTRACT**

A synthetic-speech calculator includes a keyboard consisting of digit keys and function keys and one or more mode selectors, a desired number of registers for storing numerical information entered by the depression of selected ones of the digit keys, a read-only-memory for storing a large number of digital codes as sound quantizing information, counter means for specifying the address of the memory so as to take a specific digital code out of the memory, a digital-to-analog converter for converting the specific digital code taken out of the memory into an audible sound signal, and a loud speaker driven by the audible sound signal and producing an audible sound. The synthetic-speech calculator is adapted such that the audible sound signals are derived via the loud speaker by at least two different methods of sound generation. For example, when a voice start key is depressed, all digits of keyed information are produced in audible form with appropriate pauses. In addition, numerical information is produced by digit by digit in audible form each time a voice start key is depressed. Numerical information is produced in a 3-digit group mode, each of the 3-digit groups being audibly produced each time the voice start key is depressed. Finally, numerical information may be audibly produced in order of ascending significance relative to the least significant digit or in order of descending significance relative to the most significant digit. The mode selector directs the synthetic-speech calculator how to derive the audible sound signals via the loud speaker.

16 Claims, 10 Drawing Figures



THIS INVENTION IS A PORTABLE SYSTEM WHICH ALLOWS A VERBALLY HANDICAPPED PERSON TO COMMUNICATE ORALLY. A PERSON WHO IS ALSO PHYSICALLY HANDICAPPED CAN USE THE DEVICE IN A SCANNING MODE WHERE THE VOCABULARY IS SEQUENTIALLY DISPLAYED AND A DESIRED WORD OR PHRASE SELECTED BY STOPPING THE SCAN. THE SCAN AND STOP OPERATIONS CAN BE ACCOMPLISHED EVEN IF THE USER HAS ONLY LIMITED MOTOR SKILLS IN ANY ONE BODY MEMBER.

United States Patent [19]

Ostrowski

[11] **4,215,240**

[45] **Jul. 29, 1980**

[54] **PORTABLE VOICE SYSTEM FOR THE VERBALLY HANDICAPPED**

[75] Inventor: **Carl L. Ostrowski**, Sterling Heights, Mich.

[73] Assignee: **Federal Screw Works**, Detroit, Mich.

[21] Appl. No.: **850,669**

[22] Filed: **Nov. 11, 1977**

[51] **Int. Cl.**[2] **G10L 1/00**

[52] **U.S. Cl.** ..... **179/1 SM**

[58] **Field of Search** ..... 179/1 SM

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,704,345	11/1972	Coker et al.	179/1 SM
3,794,753	2/1974	Hansen	179/1 SM
4,016,540	4/1977	Hyatt	179/1 SM
4,022,974	5/1977	Kohut et al.	179/1 SM

OTHER PUBLICATIONS

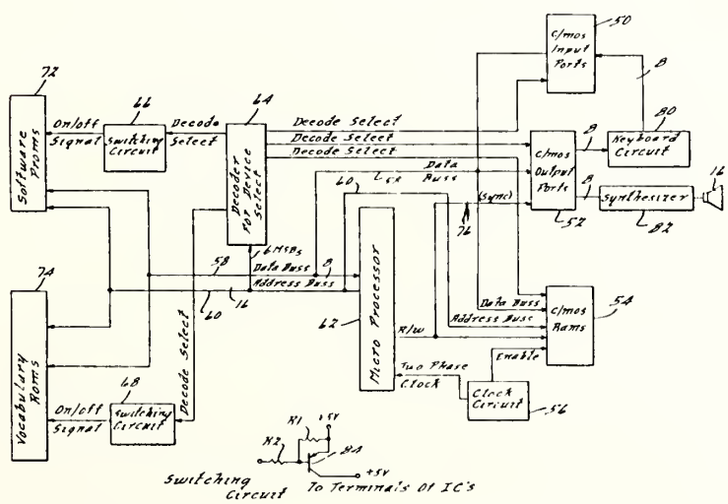
MSC, "Expandable Voice Annunciator", Spec. Sheet, PTO date, Sep. 18, 1976, pp. 1–4.

Primary Examiner—Malcolm A. Morrison
Assistant Examiner—E. S. Kemeny
Attarney, Agent, ar Firm—Harness, Dickey & Pierce

[57] **ABSTRACT**

A completely self-contained, battery operated, portable voice system for the verbally handicapped which is sufficiently compact to be hand held. The system contains a preestablished vocabulary of words, phonemes, and phrases which are accessible by the non-verbal via a keyboard. The desired message is then phonetically spoken by a speech synthesizer contained in the unit upon the depression of a TALK key. For verbally handicapped persons with minimal motor capabilities, the present invention is adapted to be operable in a scrolling scanning or "scrolling" mode wherein the numerical display is automatically rotated in sequence and the selections entered by activating a sensor switch with a single body function to stop the display at the desired number.

14 Claims, 4 Drawing Figures



THIS INVENTION IS A SMALL, SELF-CONTAINED SYNTHESIZER FOR USE IN A DOLL. THE "VOCABULARY" CONSISTS OF "INFANT-LIKE" SOUNDS WHICH INDICATE CONTENTMENT OR DISTRESS DEPENDING UPON THE CONDITIONS OF A GRAVITY-ACTUATED SWITCH IN THE DOLL.

United States Patent [19]

Stowell et al.

[11] **4,318,245**

[45] **Mar. 9, 1982**

[54] **VOCALIZING APPARATUS**

[75] Inventors: **Roger H. Stowell; Michael O. Hirtle,** both of East Aurora, N.Y.; **Russell W. Brown,** Nepean; **Arthur D. Moore,** Stittsville, both of Canada

[73] Assignee: **The Quaker Oats Company,** Chicago, Ill.

[21] Appl. No.: **114,219**

[22] Filed: **Jan. 22, 1980**

[51] **Int. Cl.**[3] **A63H 3/28**

[52] **U.S. Cl.** ..... **46/232;** 46/117; 179/1 SM; 200/61.52

[58] **Field of Search** ..... 46/232, 117, 175 AR; 35/8 A, 35 C; 179/1 SA, 1 SM, 1 SG; 200/61.45 R, 61.52, DIG. 29; 364/513

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,162,980	12/1964	Hellman	46/232
3,483,655	12/1969	Mason	46/117 X
3,560,680	2/1971	Clarke	200/61.45 R
3,636,654	1/1972	Workman	46/175 AR
4,189,779	2/1980	Brautingham et al.	35/35 C
4,221,927	9/1980	Dankman et al.	46/232 X
4,249,338	2/1981	Wexler	46/232

FOREIGN PATENT DOCUMENTS

2300407	10/1976	France	200/61.52
680161	10/1952	United Kingdom	46/117

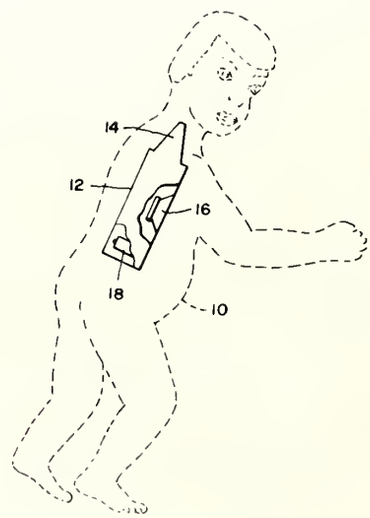
Primary Examiner—F. Barry Shay

Attorney, Agent, or Firm—Cumpston & Shaw

[57] **ABSTRACT**

Vocalizing apparatus for use in a doll which has a synthesizer for producing speech sounds. The synthesizer is controlled by a digital controller having a memory which stores information representing a vocabulary of infant-like sounds. A motion detector, which may be in the form of a gravity-actuated switch, activates the controller so as to cause the synthesizer to produce a pattern of sound simulating happy infant sounds when the doll is moved and when it is cuddled, and fussing or crying sounds when it is thereafter not moved for a time. The electronic apparatus is shut down if the doll is left unmoved for a time after it no longer emits the fussing sounds but is automatically activated when again it is moved. The vocalizing apparatus is provided in a self-contained package, removable for laundering.

25 Claims, 8 Drawing Figures



THIS INVENTION IS REPRESENTATIVE OF THE NUMEROUS TALKING GAMES ON THE MARKET. PLAYER PROMPTS AND RESPONSES ARE VERBALLY GENERATED.

United States Patent [19]

Breslow et al.

[11] **4,326,710**

[45] **Apr. 27, 1982**

[54] **TALKING ELECTRONIC GAME**

[75] Inventors: **Jeffrey D. Breslow**, Highland Park; **Erick E. Erickson**, Chicago, both of Ill.

[73] Assignee: **Marvin Glass & Associates**, Chicago, Ill.

[21] Appl. No.: **119,618**

[22] Filed: **Feb. 8, 1980**

[51] **Int. Cl.**[3] **A63F 9/00**; G09B 7/02

[52] **U.S. Cl.** ..... **273/1 E**; 179/1 SM; 434/321

[58] **Field of Search** ..... 273/1 E, 85 G; 179/1 SA, 1 SQ, 1 SM; 434/308, 319, 321, 335, 339

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,136,072	6/1964	Ross	434/319
3,696,525	10/1972	Cleary	434/339
3,908,288	9/1975	Brown, Jr.	434/319
3,928,722	12/1975	Nakata et al.	179/1 SM
4,179,584	12/1979	Tanimoto et al.	179/1 SM
4,189,779	2/1980	Brautingham	179/1 SM X
4,296,279	10/1981	Stork	179/1 SM

FOREIGN PATENT DOCUMENTS

1428157 3/1976 United Kingdom ..... 273/1 E

OTHER PUBLICATIONS

Playmeter, Technical Topics: "Games That Talk", Nov. 1978, p. 91.

JSRA Catalog, "Talking Computer", page 41.

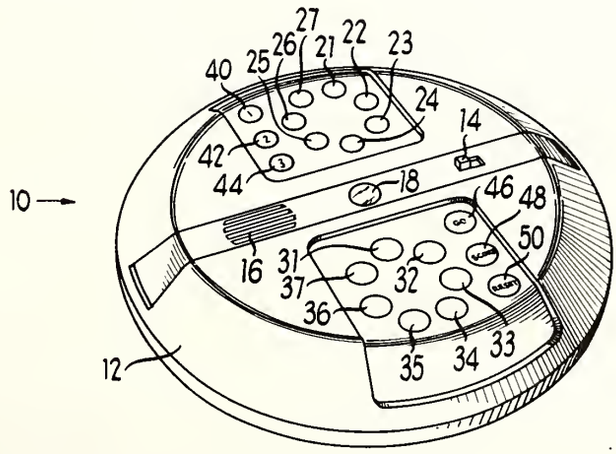
Primary Examiner—William H. Grieb

Attorney, Agent, or Firm—Mason, Kolehmainen, Rathburn & Wyss

[57] **ABSTRACT**

A talking electronic game utilizes an integrated circuit voice synthesizer to generate a plurality of beginning phrases each forming the beginning of a complete phrase and a plurality of ending phrases each forming the end of the complete phrase. The beginning and ending phrases are assigned at random to a plurality of push buttons, and the object of the game is to match up the beginning and ending phrases of the various sentences by appropriate actuation of the various push buttons.

29 Claims, 8 Drawing Figures



SPEECH ANALYSIS AND SYNTHESIS

Reference Citation Information

During the examination of an application for a patent in the United States Patent and Trademark Office, references may be cited by the examiner and/or the applicant to indicate the prior art which is most closely related to the claimed invention. Other references may be cited merely to demonstrate the current state of the art. The information below is based on the references made of record during the examination of U.S. applications which were issued as patents in the subject technology during the period 1/1975-6/1982. A more detailed explanation appears in Appendix A.

TOTAL PATENTS ISSUED (1/1975-6/1982)	364
TOTAL REFERENCES CITED	2139
U.S. Patent References Cited	1842
Foreign Patent References Cited	38
Other References Cited	259

COUNTRY OF ORIGIN OF U.S. PATENT REFERENCES CITED*	NUMBER OF CITATIONS
United States	1325
Japan	157
United Kingdom	53
France	33
West Germany	25
Switzerland	24
Netherlands	21
Sweden	11
Italy	10
Canada	6

MOST FREQUENTLY CITED PATENTS	NUMBER OF CITATIONS
3,816,722	12
3,641,496	12
4,016,540	11
3,700,815	11

MOST FREQUENTLY CITED ASSIGNEES**	NUMBER OF CITATIONS
Bell Telephone Laboratories Inc.	205
International Business Machines Corp.	63
Nippon Electric Co., Ltd.	39
International Telephone and Telegraph Corp.	29
United States of America, Navy	29

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*"Country of Origin" information is limited to U.S. patent references issued from 1/1963-6/1982.

**Assignee information is limited to U.S. patent references issued from 1/1969-6/1982.

ASSIGNMENT ANALYSIS

In an effort to examine more thoroughly corporate activity trends in the areas of **Digital Logic Circuits** and **Semiconductor Memories**, assignment data were generated to determine the number of patenting organizations*, and the influence of "active" and "new" organizations.

Number of Assignees

Figures 1 and 2 show the number of assignees per year for the period 1969-1981 in **Digital Logic Circuits** and **Semiconductors Memories**, respectively. Fig. 1 shows a fairly steady decline in the number of assignees receiving digital logic circuit patents after a peak in 1977. The number dropped by 48.6% from a high in 1971 to the 1981 level. Although this trend, to some degree, reflects the decline in patents over the same period, the decline in number of assignees is more consistent. For example, the number of assignees declined from 1980-1981, even though the number of patents increased.

Fig. 2, on the other hand, shows a relatively constant number of organizations receiving semiconductor memory patents for the years 1971-1981. The different trends in the two technological areas can perhaps be explained by the fact that digital logic circuits have evolved from relatively simple, discrete designs to mass production integrated circuits, possibly causing some less efficient companies to drop out of the market. Semiconductor memories have not experienced such a pronounced evolution, i.e., the original memories were LSI circuits, and the explosion in microprocessor technology has allowed more early companies to stay competitive.

Active Assignees

In order to determine if an increasing percentage of patents is being assigned to a decreasing number of organizations, the assignees in each technology area were divided into two groups. Those assignees holding a total of 10 or more patents during the period 1969-1981 were labeled "active," and the percentage of patents per year assigned to them was determined.

As demonstrated in Fig. 3, the percentage of digital logic circuits being assigned to "active" assignees increased steadily from 1969-1976, with the trend continuing after a drop in 1976. The small peak in 1979 is particularly interesting since the total number of patents granted in that year was lower than normal due to insufficient printing funds. In a year where the number of issued patents was artificially low, over 75% of those patents was held by "active" assignees, who represent only 12.4% of the total organizations.

Fig. 4, depicting the yearly percentage of "active" assignees in the area of semiconductor memories, indicates a continuing dominance by "active"

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*The terms organization and assignee are used interchangeably in this analysis to refer to patent owners who are other than individuals.

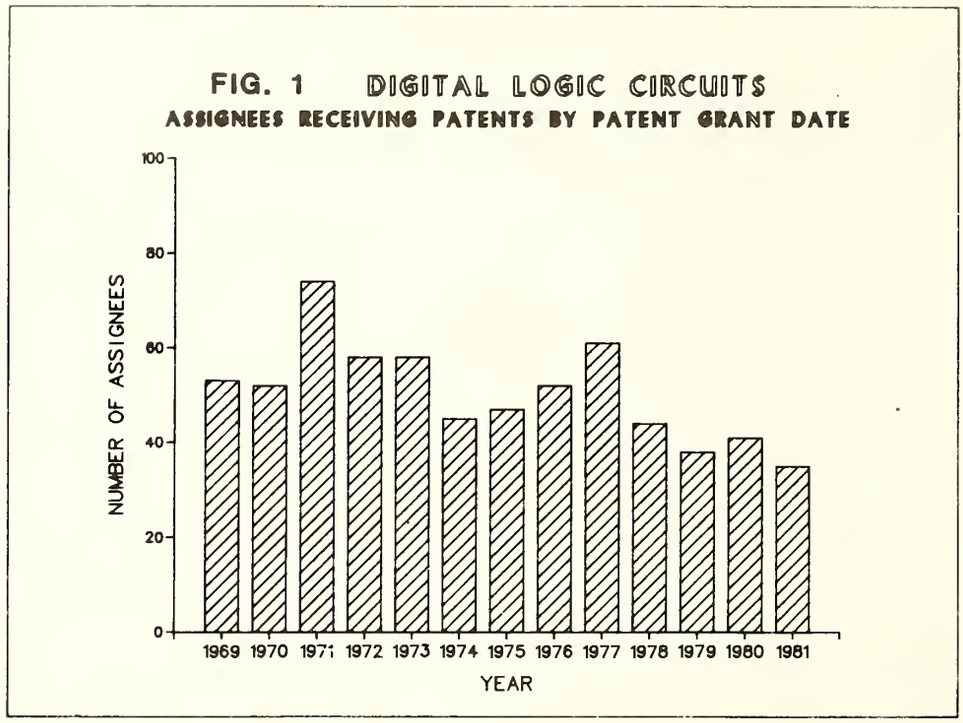
FIG. 1 DIGITAL LOGIC CIRCUITS
ASSIGNEES RECEIVING PATENTS BY PATENT GRANT DATE
NUMBER OF ASSIGNEES
0
20
40
60
80
100
1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981
YEAR

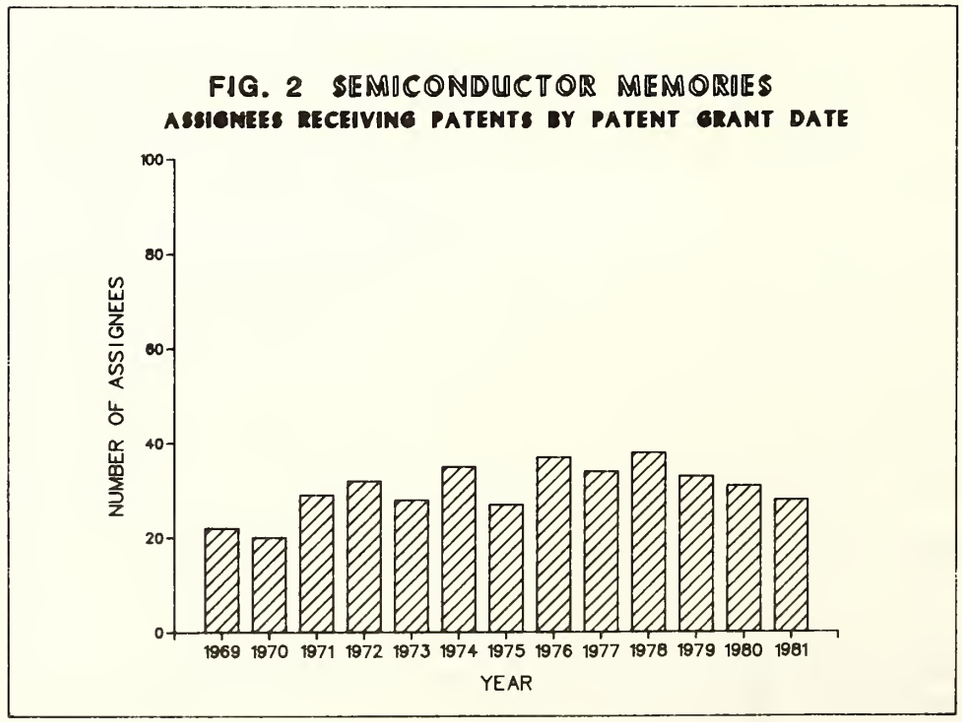
FIG. 2 SEMICONDUCTOR MEMORIES
ASSIGNEES RECEIVING PATENTS BY PATENT GRANT DATE
NUMBER OF ASSIGNEES
0
20
40
60
80
100
1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981
YEAR

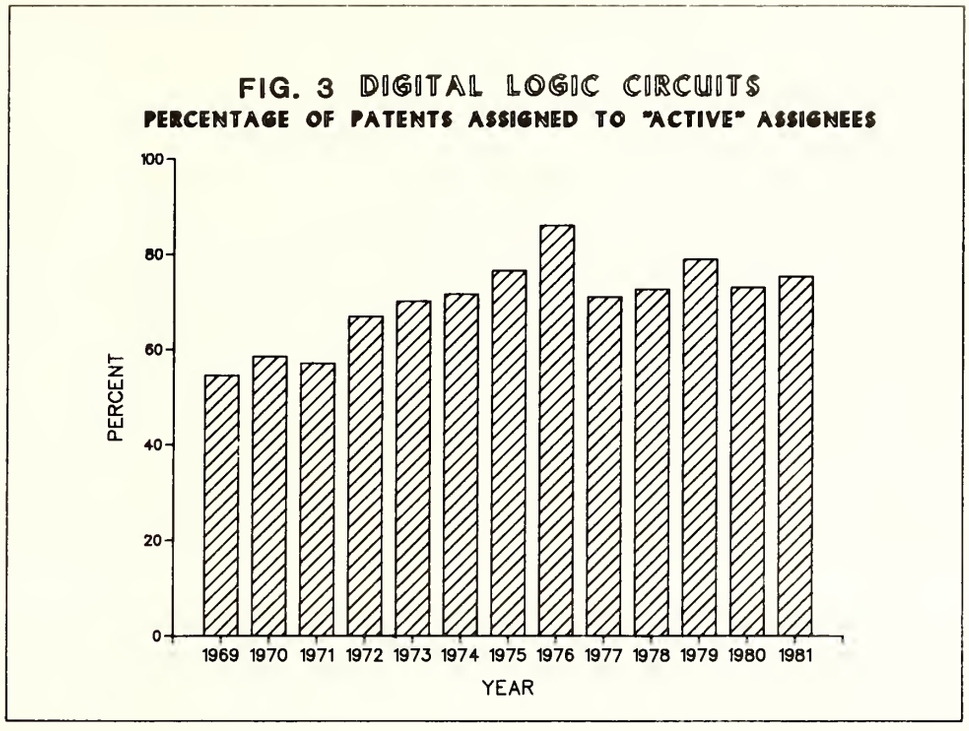
FIG. 3 DIGITAL LOGIC CIRCUITS
PERCENTAGE OF PATENTS ASSIGNED TO "ACTIVE" ASSIGNEES
PERCENT
100
80
60
40
20
0
1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981
YEAR

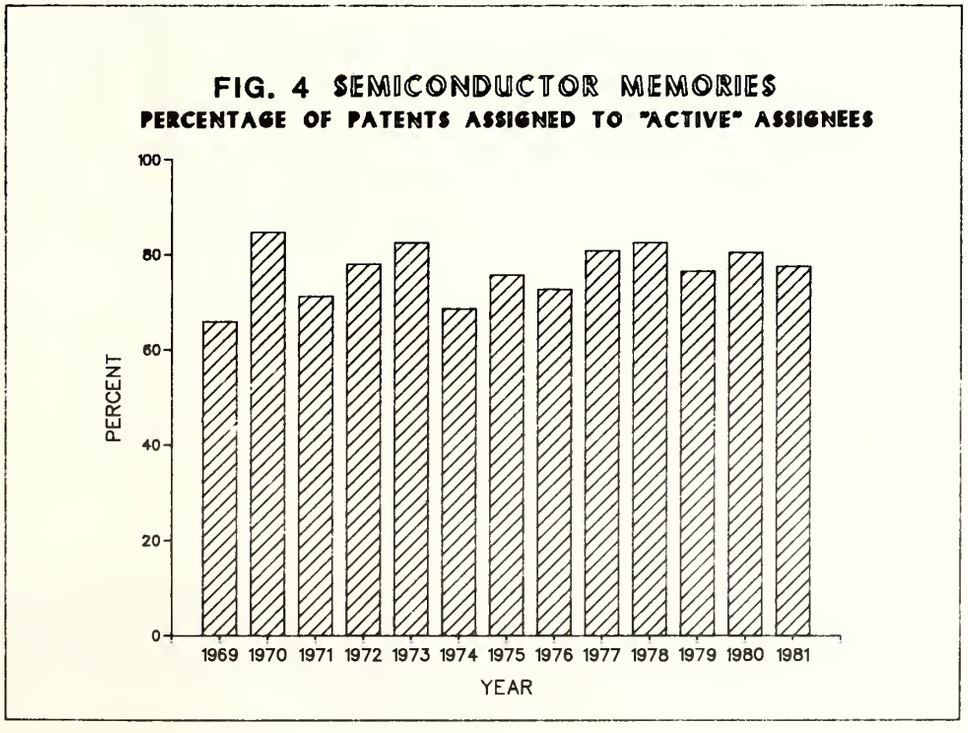
FIG. 4 SEMICONDUCTOR MEMORIES
PERCENTAGE OF PATENTS ASSIGNED TO "ACTIVE" ASSIGNEES
PERCENT
100
80
60
40
20
0
1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981
YEAR

organizations. These organizations, representing less than 20% of the total who own patents in the technology hold 68% of the semiconductor memory patents granted between 1969 and 1981, and 79% of those granted from 1977-1981.

Patterns of Organizational Patenting

In a further study, the pattern of organizational patenting was analyzed to determine the number of "new" assignees receiving patents each year. For this analysis, conducted for the years 1969-1981, the year 1969 was used as a base year. The assignees receiving patents in each subsequent year were characterized as "new" if they had not previously received one or more patents during the analysis period.* Consequently, 100% of all assignees patenting in 1969, the base year, were considered to be "new;" those patenting in 1970 which did not patent in 1969 were considered "new;" etc. Clearly, the number of new organizations reported becomes more reliable as one moves away from the base year. That is, if a company patented in the selected technology in 1979, and had not patented in the technology during any of the years 1969-1978, it is reasonable to assume that the company is "new" to the technology.

In this analysis, assignees in **Digital Logic Circuits** and **Semiconductor Memories** were further characterized into three groups: All Organizations, U.S. Organizations, and Foreign Organizations. For the purpose of this study, an organization was counted as a U.S. Organization if, in a majority of its patents, the first named inventor was a U.S. resident. The total number of organizations patenting each year in the three categories is also given, together with the percentage of the total organizations which is foreign.

For **Digital Logic Circuits**, the results are shown in Table 1. During the 1979-1981 period, foreign organizations accounted for 9 of 15 or 60% of the new assignees. By contrast over the entire analysis period of 1969-1981, foreign organizations accounted for 37.2% of the new assignees. These data are an indication that for "new actors" in this field, the foreign share of new organizations receiving patents directed to **Digital Logic Circuits** is on the increase. Examining the yearly totals to determine the foreign percentage of all organizations reveals a similar trend. Relating this information to Fig. 1 shows that, inherent in the total number of assignee receiving patents, there is an increasing number of foreign organizations and a corresponding decrease in the number of U.S. organizations.

As shown in Table 2, foreign organizations accounted for only 3 out of 13 or 23% of the new assignees in **Semiconductor Memories** for the 1979-1981 period. For the period 1969-1981, the foreign share of new assignees was 30.9%. Although the actual counts are low, the data indicate no increase in the foreign share of new organizations receiving **Semiconductor Memory** patents.

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*Ownership information in the OTAF data base relects assignment at the time of patent grant. Since subsequent name changes and mergers are not recorded, an organization patenting under a new name during the analysis period, would be counted as a "new" organization.

TABLE 1

PATTERNS OF ORGANIZATIONAL PATENTING
DIGITAL LOGIC CIRCUITS

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
ALL ORGANIZATIONS													
New Assignees	54	28	40	22	21	12	10	16	17	7	3	6	6
Total Assignees	54	52	75	58	58	45	47	53	61	44	39	41	39
% New of Total	100	53.8	53.3	37.9	36.2	26.7	21.3	30.2	27.9	15.9	7.7	14.6	15.4
U.S. ORGANIZATIONS													
New Assignees	42	20	22	13	17	7	4	10	8	3	0	4	2
Total Assignees	42	41	51	41	46	29	33	41	37	29	23	31	22
% New of Total	100	48.8	43.1	31.7	37.0	24.1	12.1	24.4	21.6	10.3	0.0	12.9	9.1
FOREIGN ORGANIZATIONS													
New Assignees	12	8	18	9	4	5	6	6	9	4	3	2	4
Total Assignees	12	11	24	17	12	16	14	12	24	15	16	10	17
% New of Total	100	72.7	75.0	52.9	33.3	31.3	42.9	50.0	37.5	26.7	18.8	20.0	23.5
% FOREIGN OF ALL	22.2	21.1	32.0	29.3	20.7	35.6	29.8	22.6	39.3	34.1	41.0	24.4	43.6

TABLE 2

PATTERNS OF ORGANIZATIONAL PATENTING
SEMICONDUCTOR MEMORIES

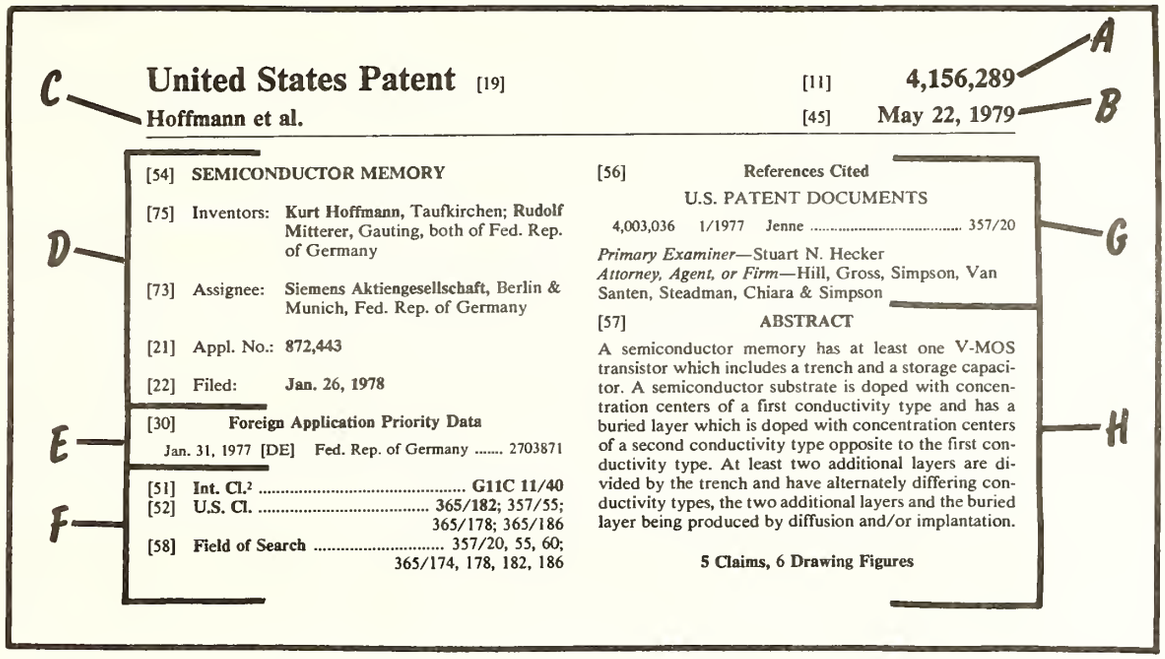
	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
ALL ORGANIZATIONS													
New Assignees	22	12	17	10	6	16	5	7	9	6	4	6	3
Total Assignees	22	20	30	32	28	35	27	37	34	38	33	32	28
% New of Total	100	60.0	56.7	31.3	21.4	45.7	18.5	18.9	26.5	15.8	12.1	18.8	10.7
U.S. ORGANIZATIONS													
New Assignees	17	12	12	5	3	7	4	6	5	4	4	4	2
Total Assignees	17	19	25	25	22	23	22	28	23	29	24	22	20
% New of Total	100	63.2	48.0	20.0	13.6	30.4	18.2	21.4	21.7	13.8	16.7	18.2	10.0
FOREIGN ORGANIZATIONS													
New Assignees	5	0	5	5	3	9	1	1	4	2	0	2	1
Total Assignees	5	1	5	7	6	12	5	9	11	9	9	10	8
% New of Total	100	0.0	100.0	71.4	50.0	75.0	20.0	11.1	36.4	22.2	0.0	20.0	12.5
% FOREIGN OF ALL	22.7	5.0	16.7	21.9	21.4	34.3	18.5	24.3	32.4	22.7	27.2	31.2	28.6

APPENDIX A

EXPLANATORY NOTES

Patent Front Pages

This brief explanation of the information available from a U.S. Patent is designed for the person unfamiliar with patents.



United States Patent [19]

Hoffmann et al.

[11] **4,156,289**

[45] **May 22, 1979**

[54] **SEMICONDUCTOR MEMORY**

[75] Inventors: **Kurt Hoffmann**, Taufkirchen; **Rudolf Mitterer**, Gauting, both of Fed. Rep. of Germany

[73] Assignee: **Siemens Aktiengesellschaft**, Berlin & Munich, Fed. Rep. of Germany

[21] Appl. No.: **872,443**

[22] Filed: **Jan. 26, 1978**

[30] **Foreign Application Priority Data**

Jan. 31, 1977 [DE] Fed. Rep. of Germany 2703871

[51] **Int. Cl.**[2] **G11C 11/40**

[52] **U.S. Cl.** **365/182**; 357/55; 365/178; 365/186

[58] **Field of Search** 357/20, 55, 60; 365/174, 178, 182, 186

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,003,036 1/1977 Jenne 357/20

Primary Examiner—Stuart N. Hecker

Attorney, Agent, or Firm—Hill, Gross, Simpson, Van Santen, Steadman, Chiara & Simpson

[57] **ABSTRACT**

A semiconductor memory has at least one V-MOS transistor which includes a trench and a storage capacitor. A semiconductor substrate is doped with concentration centers of a first conductivity type and has a buried layer which is doped with concentration centers of a second conductivity type opposite to the first conductivity type. At least two additional layers are divided by the trench and have alternately differing conductivity types, the two additional layers and the buried layer being produced by diffusion and/or implantation.

5 Claims, 6 Drawing Figures

A. **4,156,289** is the U.S. Patent number.

B. **May 22, 1979** is the issue date.

C. **Hoffmann** is the last name of the inventor who is listed first.

C. **et al** indicates that there are other inventors.

D. **Semiconductor Memory** is the title describing the claimed invention.

D. The patent shows the name and city of residence of each of the **Inventors.** Unassigned patents show the full address of the Inventors.

D. **Assignee** refers to a company, organization or individual to which the inventors' rights to a patent are assigned. The name and city are shown.

D. **872,443** is the serial number given to the application, which was filed on **Jan. 26, 1978.**

E. **Foreign Application Priority Data** indicates corresponding applications which were filed in other countries, gives the filing date and foreign application number. By fulfilling certain requirements, an applicant filing in the U.S. may be entitled to the benefit of the filing date of a prior application in a foreign country.

F. **Int. Cl...G11C 11/40** is the International Patent Classification.

F. **U.S. Cl...365/182, 357/55, 365/178 and 365/186** are the four U.S. Classifications listed for this patent: Class 365, subclass 182, Class 357, subclass 55, Class 365, subclass 178 and Class 365, subclass 186. The classification listed in boldface on the patent is called the original classification (OR). The others are the cross-reference classifications (XR). Every patent has one and only one original classification. If the disclosure of the patent falls into more than one subclass, additional copies of the patent are placed in those subclasses as cross-reference classifications.

F. The **Field of Search...** refers to the U.S. Classification where the Patent Examiner searched to compare the claimed subject matter to that disclosed in previous patents and articles.

G. **References Cited** refers to references which may be cited by the examiner and applicant to show the state-of-the-art or to indicate the prior art most closely related to the invention which is claimed in the application.

H. The Patent and Trademark Office (PTO) requires that the patent application include a brief **Abstract** of the technical disclosure in the specification. The purpose of the abstract is to enable the PTO and the public to determine quickly the nature and gist of the technical disclosure.

H. The front page also lists the number of **Claims** and the number of **Drawing Figures** in the patent. When appropriate, a representative drawing is also included on the front page of the patent.

Country Codes

The following country codes appear in Part 2D of the profiles.

CA - Canada
CH - Switzerland
DT - West Germany
FR - France
IT - Italy
JA - Japan
JP - Japan
NO - Norway
SE - Sweden
SU - Soviet Union

Application Filing Date

The application filing date information as set forth in Parts 1 and 2A of the profiles is determined by taking all patents which issued between 1/1967 and 6/1982 and distributing them according to the year the application was filed in the PTO. Patents which were granted prior to 1967 are not included since the application date information for these patents is not in the data base. Also, applications which were filed but never issued (roughly 30% of the total filings), as well as those applications which were still pending as of June 30, 1982, are not included. Thus, only those applications which were filed and subsequently became patents with patent grant dates between 1967 and June 30, 1982, are included.

While the length of time between the patent application date and the patent grant date varies from patent to patent, the current average pendency is in excess of 24 months. Clearly many applications filed in 1981 were still pending at the middle of 1982, as were a number of those filed in 1980. Thus, application filing date data for these years are incomplete. While a small number of applications which were filed prior to 1980 were still pending, OTAF feels that the application date data prior to January 1980 are essentially complete. That is, the number shown for applications filed in the years prior to 1980 will not differ substantially with the passage of time, and is a true reflection of the number of applications filed which have, and will, become patents. However, for 1980, 1981 and 1982, the number will increase as more applications filed in those years become patents.

It should be remembered that the numbers reflect only those applications which became patents between 1/1967 and 6/1982. The column "pre-69" does not include all applications filed before 1969 but only those which issued in 1967 and subsequently. The graph of this information in Part 1 of each profile is limited to the years 1970-1979, years for which the application date data are essentially complete. Thus, the graphs are accurate representations of activity based on the application dates of subsequently issued patents.

Assignee

The term "assignee" refers to a company, organization or individual to which the inventor's rights to a patent are assigned. For the purpose of this publication, the assignee will, in all cases, refer to the assignee at the time the patent was granted. Subsequent changes in assignment, name changes and/or mergers are not recorded. Approximately 80% of all U.S. patents are assigned when granted. By far, the largest portion of assignees are corporations.

Composite Total

Part 2C of each profile contains an alphabetical listing of assignees. In some instances, assignees are listed in more than one place due to variations in the printing of the name. These variations occur for a number of reasons, such as typographical errors, changes in company names, or differences in spacing or abbreviations.

Composite Total (cont.)

In Part 2B of each profile, which ranks assignees according to the number of patents held, the number of patents listed for certain assignees may be a composite resulting from the combination of different titles which in fact signify identical assignees. An asterisk appears next to these totals. This will alert the reader that the particular assignee is listed under more than one title in Part C. The assignees making up composite groupings are listed below:

For: American Micro-Systems Inc.
See Also: American Microsystems

For: Electronic Arrays, Inc.
See Also: Electronics Arrays, Inc.

For: GTE Automatic Electric Laboratories, Inc.
See Also: Automatic Electric Laboratories, Inc. and
GTE Automatic Electric Labs, Inc.

For: Nissan Motor Company, Limited
See Also: Nissan Motor Company, Ltd.

For: Nippon Telegraph and Telephone Public Corporation
See Also: Nippon Telephone and Telegraph Public Corporation

For: Southern Pacific Company
See Also: Southern Pacific Transportation Company

For: Standard Telephones and Cables Pty., Limited
See Also: Standard Telephones and Cables Limited

Reference Citation Information

During the examination of applications for U.S. patents, the examiner and the applicant may cite references which they believe to be representative of the prior art most closely related to the claimed invention. Such references are made of record in the application, indicating that they have been considered by the examiner. Part 4 of each profile sets forth data based on the references cited during the examination of patents which issued in the technology from 1/1975 through 6/1982. Citations may be U.S. patents, foreign patents or non-patent (literature) references, and the number of each is listed.

Under the heading, "Country of Origin of U.S. Patent References Cited," the residence countries of the inventors of the technology disclosed in the references are listed, together with the number of citations from each country. This information relates to U.S. patent references only, with grant dates after 1/1963.

A particular U.S. patent may be cited as a reference in more than one application, and frequently-cited patents may be more important than

Reference Citation Information (cont.)

those less frequently cited. Consequently, a list of the four "Most Frequently Cited U.S. Patents" is given along with the number of applications in which each was cited.

The "Most Frequently Cited Assignees" is a list of the four assignees whose patents were used most often as references during the examination period of the patents which issued in the subject area. If a particular patent is used as a reference in more than one application, the "Number of Citations" will reflect each time it was cited. Assignee information applies to U.S. patent references with grant dates after 1/1969.

* * *

PATENTS INCLUDED IN THE PROFILES

Patent activity profiles are normally generated by first identifying key Patent and Trademark Office classifications, i.e., those entirely or substantially pertinent to the technology of interest. All the patents in these classifications are then included in the profile. This procedure results, in most cases, with the inclusion of the majority of patents relevant to the technology and few non-relevant patents. While one can never be sure of the absolute completeness or "purity" of any subset in a collection as large and varied as the patent file, it is felt that the patent file portions selected for review in this publication include patents representative of the overall trends in the defined areas and essentially exclude patents which are not relevant to the subject technology.

SAMPLE

ORGANIZATIONAL PROFILE - PATENTS ASSIGNED TO A.O. SMITH CORPORATION

CLASS 029 - METAL WORKING

SUBCLASS 33 P	TOTAL	1	(OR)	0	(XR)	1	PCT OF TOTAL OR	0.0	PCT OF ALL (OR+XR)	.2
3612815 (XR) - ELECTRON BEAM APPARATUS										
SUBCLASS 155 R	TOTAL	1	(OR)	0	(XR)	1	PCT OF TOTAL OR	0.0	PCT OF ALL (OR+XR)	.2
3420032 (XR) - LOCKING LANCE TAB PRE-ASSEMBLY OF BOX-SECTION FRAME MEMBER										
SUBCLASS 407	TOTAL	1	(OR)	0	(XR)	1	PCT OF TOTAL OR	0.0	PCT OF ALL (OR+XR)	.2
3596352 (XR) - METHOD OF CALIBRATING BIMETALLIC ELEMENTS IN A THERMAL OVERLOAD SWITCH										
SUBCLASS 453	TOTAL	1	(OR)	0	(XR)	1	PCT OF TOTAL OR	0.0	PCT OF ALL (OR+XR)	.2
3420032 (XR) - LOCKING LANCE TAB PRE-ASSEMBLY OF BOX-SECTION FRAME MEMBER										
SUBCLASS 527.2	TOTAL	1	(OR)	1	(XR)	0	PCT OF TOTAL OR	.7	PCT OF ALL (OR+XR)	.2
3465424 (OR) - METHOD OF FORMING GLASS COATED STEEL ARTICLES										
SUBCLASS 593	TOTAL	1	(OR)	0	(XR)	1	PCT OF TOTAL OR	0.0	PCT OF ALL (OR+XR)	.2
3596352 (XR) - METHOD OF CALIBRATING BIMETALLIC ELEMENTS IN A THERMAL OVERLOAD SWITCH										
SUBCLASS 596	TOTAL	5	(OR)	4	(XR)	1	PCT OF TOTAL OR	3.0	PCT OF ALL (OR+XR)	1.1
3512902 (XR) - INDUCTIVE CORE DEVICE AND METHOD OF MAKING THE SAME 3518754 (OR) - METHOD OF MANUFACTURING A MOTOR STATOR ASSEMBLY 3742595 (OR) - METHOD OF MANUFACTURING A SUBMERSIBLE MOTOR 3821846 (OR) - METHOD OF MANUFACTURING A MOTOR STATOR ASSEMBLY 4090290 (OR) - METHOD OF MAKING AN ELECTRIC MOTOR WINDING INSULATING BARRIER										
SUBCLASS 598	TOTAL	1	(OR)	1	(XR)	0	PCT OF TOTAL OR	.7	PCT OF ALL (OR+XR)	.2
4199861 (OR) - METHOD OF MAKING AN END PLAY CONTROL ASSEMBLY										
SUBCLASS 609	TOTAL	2	(OR)	0	(XR)	2	PCT OF TOTAL OR	0.0	PCT OF ALL (OR+XR)	.4
3518754 (XR) - METHOD OF MANUFACTURING A MOTOR STATOR ASSEMBLY 3821846 (XR) - METHOD OF MANUFACTURING A MOTOR STATOR ASSEMBLY										
SUBCLASS 622	TOTAL	1	(OR)	1	(XR)	0	PCT OF TOTAL OR	.7	PCT OF ALL (OR+XR)	.2
3596352 (OR) - METHOD OF CALIBRATING BIMETALLIC ELEMENTS IN A THERMAL OVERLOAD SWITCH										
SUBCLASS 732	TOTAL	3	(OR)	1	(XR)	2	PCT OF TOTAL OR	.7	PCT OF ALL (OR+XR)	.7
3689976 (XR) - COIL TRANSFER APPARATUS 3742595 (XR) - METHOD OF MANUFACTURING A SUBMERSIBLE MOTOR 3858296 (OR) - COIL PROCESSING APPARATUS										

SAMPLE ENTERPRISE REPORT

MATSUSHITA ELECTRIC INDUSTRIAL CO. LTD.

PATENTS GRANTED - BY CLASS BY YEAR

CLASS	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	TOTAL
029	3	4	6	7	8	6	5	2	3	3	3	6	56
148	1	3	2	2	1	6	7	9	4	6	5	5	51
156	1	2	2	2	2	1	4	1	0	5	0	2	22
179	1	3	3	6	9	13	18	19	23	16	9	14	134
204	4	7	5	7	5	9	5	2	4	1	1	2	52
219	0	10	6	8	5	12	6	21	13	16	6	6	109
242	3	1	8	6	6	9	7	4	5	1	2	1	53
250	4	4	9	7	4	4	5	1	0	5	2	2	47
252	11	16	10	26	11	4	9	18	8	7	4	6	130
260	0	0	1	1	0	0	0	0	1	1	0	1	5
307	1	3	4	5	5	4	9	9	6	2	1	1	50
310	4	11	3	1	5	4	4	1	6	1	2	4	46
313	2	5	10	4	10	12	11	2	3	5	1	2	67
315	4	3	16	4	11	6	4	6	4	1	3	5	67
318	1	6	11	9	2	2	1	2	7	2	5	7	55
330	2	1	0	0	2	6	0	1	0	3	2	1	18
331	0	0	2	6	6	2	3	3	3	0	1	3	29
340	0	1	4	1	5	7	5	4	5	4	1	3	40
350	1	0	2	1	2	1	8	12	8	1	1	3	40
354	0	0	0	0	0	2	2	2	1	0	1	0	8
357	6	3	9	12	11	10	6	3	3	3	3	4	73
358	1	3	12	14	31	22	18	27	27	14	13	24	206
360	14	16	19	36	25	29	33	24	14	28	10	12	260
361	1	4	7	6	4	6	7	6	7	2	2	4	56
364	0	0	5	3	1	3	2	0	0	2	0	0	16
365	0	1	1	3	1	1	0	1	0	1	1	1	11
427	4	9	3	4	1	5	2	4	2	2	0	0	36
428	1	3	2	2	2	3	2	2	3	3	6	2	31
430	3	4	3	3	8	5	6	4	4	3	0	1	44
455	2	5	7	3	2	8	8	14	8	2	3	6	68
525	0	0	0	1	0	0	1	1	0	0	0	0	3
528	0	1	0	0	0	0	0	0	0	0	1	0	2
546	0	0	0	0	0	0	0	1	0	0	0	1	2
548	0	0	0	0	0	0	0	0	0	0	1	0	1
TOTAL	75	129	172	190	185	202	198	206	172	140	90	129	1888

SIC PRODUCT FIELDS

PRODUCT FIELDS	SIC CATEGORY
Food and Kindred Products	20
Textile Mill Products	22
Chemicals and Allied Products	28
Chemicals, Except Drugs & Medicines	281, 282, 284-289
Basic Industrial Inorganic & Organic Chemistry	281, 286
Industrial Inorganic Chemistry	281
Industrial Organic Chemistry	286
Plastics Materials & Synthetic Resins	282
Agricultural Chemicals	287
All Other Chemicals	284, 285, 289
Soap, Detergents, and Cleaning Preparations, Perfumes, Cosmetics & Other Toilet Preparations	284
Paints, Varnishes, Lacquers, Enamels, and Allied Products	285
Miscellaneous Chemical Products	289
Drugs and Medicines	283
Petroleum & Natural Gas Extraction & Petroleum Refining	13, 29
Rubber & Miscellaneous Plastics Products	30
Stone, Clay, Glass and Concrete Products	32
Primary Metals	33, 3462, 3463
Primary Ferrous Products	331, 332, 3399, 3462
Primary & Secondary Non-Ferrous Metals	333-336, 339 (except 3399), 3463
Fabricated Metal Products	34 (except 3462, 3463, 348)

PRODUCT FIELDS	SIC CATEGORY
Machinery, Except Electrical	35
Engines & Turbines	351
Farm & Garden Machinery & Equipment	352
Construction, Mining & Material Handling Machinery & Equipment	353
Metal Working Machinery & Equipment	354
Office Computing & Accounting Machines	357
Other Machinery, Except Electrical	355, 356, 358, 359
Special Industry Machinery, Except Metal Working Machinery	355
General Industrial Machinery & Equipment	356
Refrigeration & Service Industry Machinery	358
Miscellaneous Machinery, Except Electrical	359
Electrical and Electronic Machinery, Equipment and Supplies	36, 3825
Electrical Equipment, Except Communication Equipment	361-364, 369, 3825
Electrical Transmission & Distribution Equipment	361, 3825
Electrical Industrial Apparatus	362
Other Electrical Machinery, Equipment & Supplies	363, 364, 369
Household Appliances	363
Electrical Lighting & Wiring Equipment	364
Miscellaneous Electrical Machinery, Equipment & Supplies	369

PRODUCT FIELDS	SIC CATEGORY
Communication Equipment & Electronic Components	365-367
Radio & Television Receiving Equipment, Except Communication Types	365
Electronic Components & Accessories & Communication Equipment	366-367
Transportation Equipment	37, 348
Motor Vehicles & Other Transportation	348, 371, 373-376, 379
Motor Vehicles & Motor Vehicles Equipment	371
Guided Missiles & Space Vehicles & Parts	376
Other Transportation Equipment	373-375, 379 (except 3795)
Ship & Boat Building & Repairing	373
Railroad Equipment	374
Motorcycles, Bicycles & Parts	375
Miscellaneous Transportation Equipment	379 (except 3795)
Ordnance Except Missiles	348, 3795
Aircraft & Parts	372
Professional & Scientific Instruments	38 (except 3825)

APPENDIX D

ACKNOWLEDGMENTS

Patent and Trademark Office contributors to this publication are listed below. Special thanks are extended to Patent and Trademark Office professional and technical personnel whose continuing input to the Technology Assessment and Forecast program is indispensable.

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